# PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

PULP

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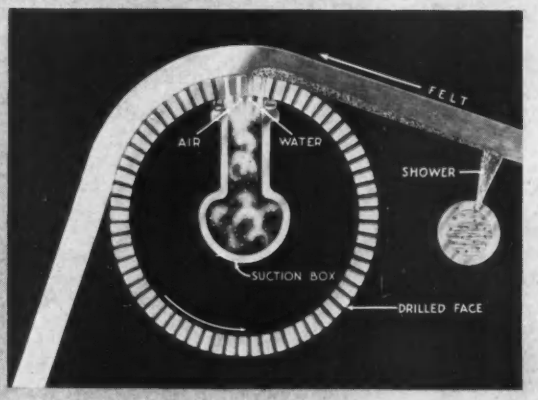
# DOWNINGTOWN

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# PAPER TRADE JOURNAL

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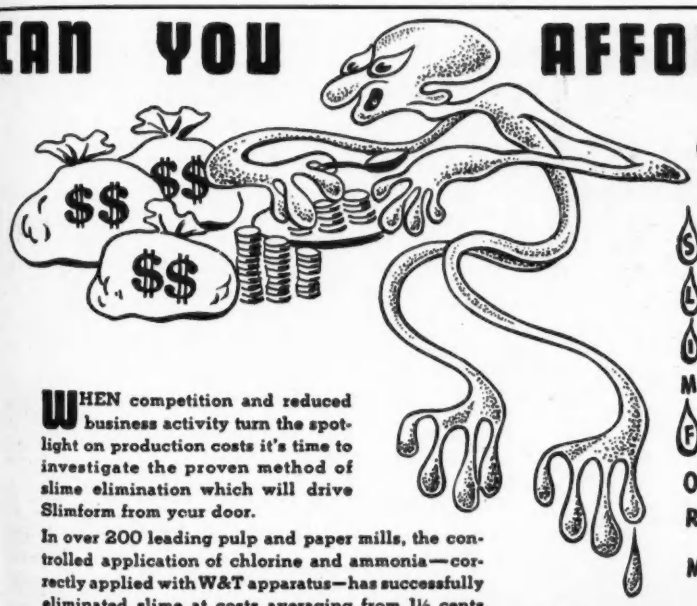
CAN YOU AFFORD TO FEED Slimform?




**S**tock losses—bacterial decomposition and reworking of stock

**L**owered Quality—slime spots—pin hole—objectionable odors

**O**ncreased Costs—in water, heat, labor, chemicals

**M**aintenance Troubles—blinded wires—plugged felts

**F**requent Clean-ups—slime breaks, poor sheet formation

**O**bstruction of Lines—stock and white water lines

**R**ecirculation Difficulties—slime growths in recirculated systems

**M**echanical Strain on felts and wires—shortened useful felt and wire life

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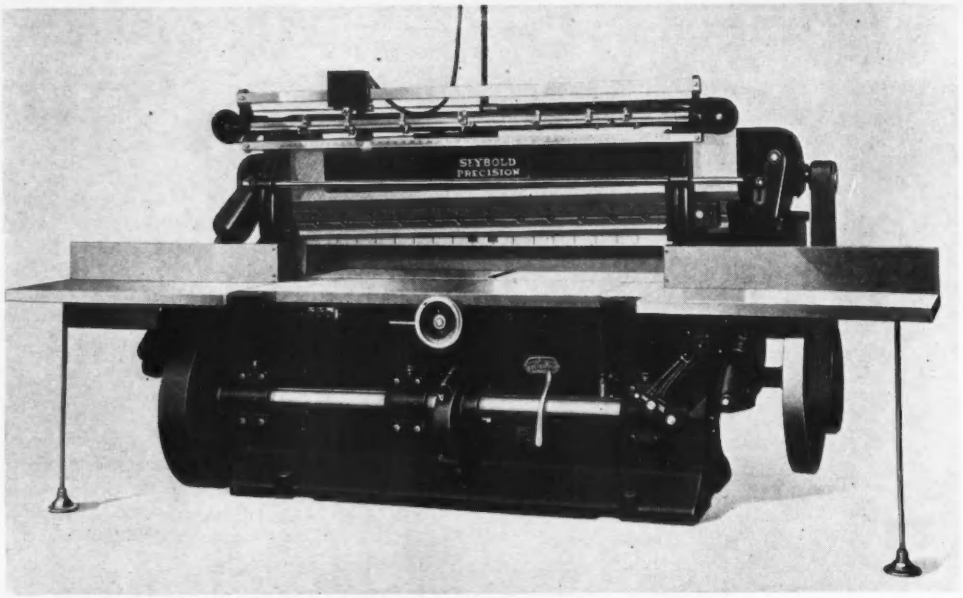


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# Consolidated and Mosinee File Applications

## Plans for Extensive Power Improvements Filed By Paper Companies In Connection With $26,000,000 Power and Flood Development By Wisconsin Hydro Authority—Pension Plans of Paper Companies—Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, WIS., August 22, 1938—Three applications have been filed with the Federal Power Commission in connection with the $26,000,000 water storage, power development and flood control project contemplated by the Wisconsin Hydro Authority.

The Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., has requested permission to construct dams and power houses and a portage diversion canal at Germantown, Pentenwell and Dancy, Wis. The estimated cost of this project is $20,000,000.

A second application has been filed by the Consolidated Water Power Company, a subsidiary of the above paper company, to construct a power plant at Knowlton, Wis., to cost approximately $2,928,000.

The third applicant is the Mosinee Paper Mills Company, Mosinee, Wis., which plans to rebuild and modernize its dam on the Wisconsin River at an estimated cost of $249,330. The dam will be enlarged and the head of water increased to make it adequate for the additional water supply contemplated by the mammoth storage reservoir on the Little Eau Pleine River.

### Applications Contingent on PWA Grants

These applications are contingent upon the granting of PWA money for 45 per cent of the cost, and a PWA loan for the remainder, but were filed now so as to expedite action. It is planned that construction work will start about November 1 so the new reservoir will be in readiness for flood waters next spring. Similar applications are already on file with the Wisconsin Public Service Commission at Madison, and hearings have been scheduled.

Under the financial setup proposed, $11,900,000 will be the amount of the outright PWA grant, and the PWA loan will be $14,100,000. The financial agreement covering the loan will be in the form of a bond issue given by the Wisconsin Hydro Authority, a non-profit quasi public corporation whose officers will be the governor, lieutenant governor, secretary of state, state treasurer and attorney general of Wisconsin. They will elect officers of the Authority and engage a general manager who will carry out the construction and direct the operations.

Bonds are to extend over a period of forty years at the end of which time ownership of the entire water power will revert to the state under the "recapture" clause of the law.

The first annual payment will be $186,000 due in 1942, two years after completion of the project. Interest will be four per cent, and will amount to $564,000 each year for the first four years.

### Revenues from Water and Electric Power

Revenues will be derived from the sale of both water and electrical energy. The estimated net profit for the first year of operations has been placed at $179,089. From that figure, estimates place the profit at $234,595 for the tenth year, $320,494 in the twentieth year, $447,646 in the thirtieth year, and $613,549 at the end of the fortieth year when the project becomes the property of the state. During the 40-year period it is estimated the entire loan of $14,100,000 wil have been repaid and there will be an excess of $158,708 remaining in interest income. The net profit of the Authority has been estimated to reach $13,566,824 over the same lentgh of time, which in turn would be the earned surplus in 40 years. Depreciation during that time is estimated at $8,601,136.

Estimated income from sale of power by the three big generating plants on the Wisconsin River at Knowlton, Pentenwell and Germantown is $1,517,870 annually. Power production is estimated by competent engineers at 227,000,000 kilowatt-hours of firm power and 51,180,000 kilowatt-hours of surplus or dump power.

### Income from Falls Estimated at $280,000

Tolls will be collected from paper mills and other water users along the Wisconsin River for stored water released from the reservoirs, and this income is estimated at $280,000 annually. Combined income from power sales and water tolls will be $1,797,870 annually.

Gross operating costs will aggregate $974,542 annually, leaving a gross income of $823,328 to retire PWA indebtedness and pay interest.

It is estimated by the Wisconsin Utilities Association that the annual increase in demand for electrical generation after 1937 will be 246,000,000 kilowatt-hours. The three proposed generating plants of the

*(Continued on page 22)*

# Government to Fortify Anticosti Island

## Canadian Navy and Air Force Survey Island for Suitable Air and Sea Bases To Prevent Possibility of Its Control By Foreign Power—Consolidated Explains Its Position—Germany Buys Pulp Wood — Other News

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, QUE., August 22, 1938—As an immediate outcome of the attention focussed on the Island of Anticosti, in the Gulf of the St. Lawrence, by the negotiations conducted by a German syndicate for the purchase of the pulpwood resources of the island, the federal Department of National Defense has announced plans for the fortification of the island, thus removing all possibility of it falling into the hands of a foreign power. Members of the Royal Canadian Navy and Royal Canadian Air Force have already completed a survey of the island for suitable air and sea bases.

The island, which is 530 miles east of Montreal, is 135 miles long, with a mean breadth of 25 miles. Its area is approximately 3,100 square miles. Subsequent to the British conquest of Canada, it belonged to The Company of English Adventurers, and in 1895 it was sold to Henri Menier, French chocolate manufacturer, at a reputed price of $125,000. The multi-millionaire "chocolate king" built a 30-room castle on the island and tried to exploit it as a farming settlement for old country Frenchmen, at the same time initiating a plan for cutting and selling the timber for pulpwood. A railway was built for handling pulpwood as well as a rossing plant, and loading wharves. During a period of years considerable quantities of pulpwood were exported, mainly by vessels plying between the island and ports on the Great Lakes. The pulpwood is mostly a superior type of balsam, and at present it is estimated that there are 500,000,000 standing trees on the island.

In 1926 the heirs of Henri Menier sold the island to the Anticosti Corporation, now a subsidiary of Consolidated Paper Corporation, for a reported price of $6,000,000. So far the property has proved a heavy liability to the company, which has exploited it mostly as a game and fish preserve to which sportsmen are invited. Following negotiations for the purchasing of the pulpwood resources of the island by a German-Dutch syndicate late last year, and the survey of the island by a party of German engineers, a flood of protests was despatched to the provincial and federal governments, resulting, as stated, in the present plans for the fortification of the island. It is stated that the option to purchase the island, or its pulpwood resources, is still in force, and is held by A. Meidle, of Amsterdam, on behalf of the German syndicate.

### Consolidated Outlines Company's Position

The Consolidated Paper Corporation is still hopeful something may be done with the island's pulpwood. It could give employment to 3,000 to 4,000 men. Nearly $1,500,000 would be needed to rehabilitate equipment and install new machinery.

Company officials said that since it ceased operation on the island in 1929, it has maintained the people there. No islander has received federal or provincial relief and Consolidated's expenditures on the island were $65,000 a year more than its revenue from it.

There has been reports here that unless a market is found for the island's pulpwood, residents may have to leave as the corporation cannot continue to carry the deficit. The island is held in freehold. There are no stumpage dues or ground rents. An impost of $1.25 a cord is paid on leasehold wood lots.

Corporation officials said that the idea of military use of the island by a foreign power never entered into the proposed deal for its sale or lease. The island is ice-bound five months a year.

"We look upon the island as a wood farm, similar to those on the mainland from which any farmer may sell his pulpwood," said one official. "He sells it usually when he is hard up. This company is hard up. We are attempting to dispose of the wood. We have no money to take it out ourselves. It can be made a profitable operation by the expenditure of capital."

Present officials have no present intimation as to what the option holder intends to do.

### German Pulpwood Buyers Active

Meanwhile German buyers of pulpwood have transferred their attention to the Maritime Provinces, from which they have already bought large quantities of pulpwood. Contracts for the supply of some 400,000 cords of pulpwood during the present season are reported to have been made in New Brunswick. Purchases are also being made in Nova Scotia, the first co-operative shipment of 2,500 cord to Germany having been shipped from Halifax to Germany last week.

### Pick-up in Sulphite Market

There are indications of an increase in the demand for sulphite pulp and a recent development which promises to be of considerable importance to the future operations of sulphite producers is that of "custom-made" sulphite. This arises from the many new uses to which sulphite pulp is now being put as a result of chemical research. For a number of these new products of which sulphite pulp is the base, special weights and grades of sulphite are required.

Supplying of these "custom-made" sulphites naturally involves switching in production processes, adds to mill costs, and will probably call for considerably higher prices being paid by the consumer of these special grades. More important still, the custom-built development will make for a broadening of the market for sulphite pulp and will make the industry less dependent upon the paper and rayon industries for its business.

### Port Royal Pulp Mill

For some time past the Port Royal Pulp and Paper Company's plant at Saint John, N. B., has been closed down owing to inability of Japanese importers to secure the necessary exchange credit on foreign purchases of pulp. The local Board of Trade has now formed a special committee to assist in bringing about a re-opening of the plant and A. J. Lacroix, the manager, says this may be accomplished any day now.

*Machine by*
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DOWNINGTON MANUFACTURING CO.

*Covered by*
STOWE-WOODWARD, INC.

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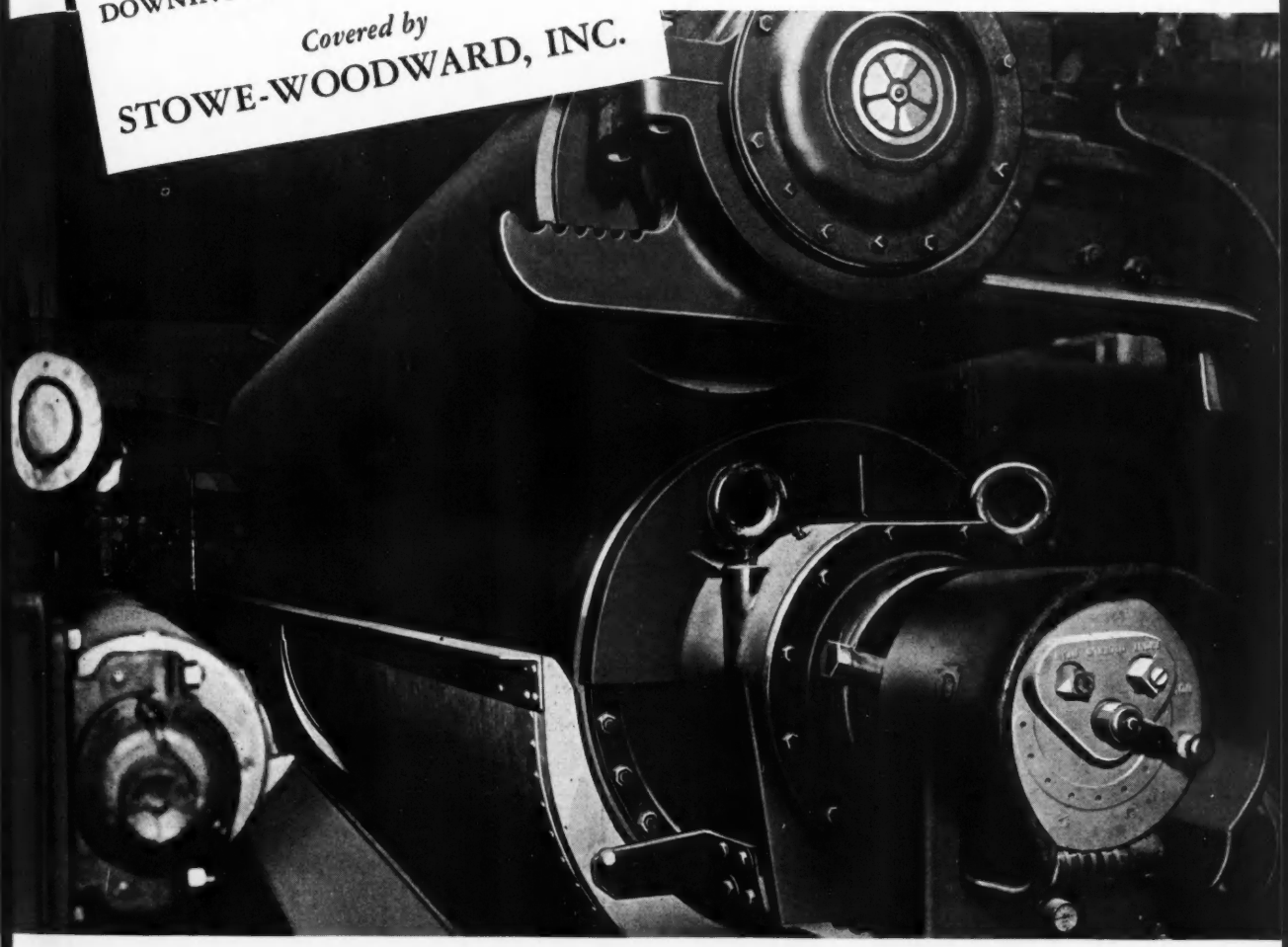

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# More Optimism Reflected in Chicago Market

## Little Change In Demand For Paper Reported In Midwest But Improvement Continues In Waste Paper Trade—Ground Wood Executives Meet At Country Club—S.A.P.I. Announce Golf Winners—Other Trade News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., August 22, 1938—Little change in the local paper market was noted during the past six days. Waste papers and their gradual recovery from the virtually demoralized situation of a few weeks ago continued to "highlight" the picture. It seems obvious that waste paper sources came close to drying up during the period of demoralization and the pendulum is now reported to be swinging the other way. Otherwise, the market was somewhat colorless with prices holding in a narrow range and conditions indicating a procedure of "marking time". Kraft papers are reported to have done a commendable job of holding firm and some added strength is now given the picture. Ground wood papers showed little disposition to change and the outlook continued fair. Demand in fine papers was a bit better than expected, according to local reports. Book paper mills had a more encouraging story to tell as did the cover representatives in the local market. Paper board conditions are about the same. All lines interviewed felt that the trend when the next move does come will be upward and there is a general feeling of optimism locally.

### Groundwood Executives Meet at Country Club

A somewhat new departure in the holding of meetings—and it is reported to have worked out successfully—was the staging of the regular Groundwood Paper Manufacturers Association sessions at the Olympia Fields Country Club, near Chicago, on August 18-19. Schedules were arranged to give visitors an opportunity to make the occasion a combined business and pleasure affair with the ample facilities of the big country club contributing to an enjoyable affair. Ground wood printing papers executives met during the morning of Thursday, August 18, while the Handing Raw Stock Group, the Catalogue Group and the Poster and Railroad Group arranged for luncheon sessions which extended on until two in the afternoon. The schedule also called for a general dinner meeting of all groups to be held at the Club and for a resumption of the general meeting discussions on the morning of August 19.

### Midwest Salesmen Golf Winners

The midwest division of the Salesmens Association of the Paper Industry has selected Thursday, September 22, as the day for its final golf outing at the Olympia Fields Country Club, to be held in conjunction with the National Paper Trade Association meeting in Chicago. Graham Olson, golf chairman, advises that a sufficiently large turnout is expected to necessitate the reservation of two of the four courses at Olympia Fields. The semi-final event at the Park Ridge Country Club attracted 47 members and guests with the following prize winners announced: low gross, Gene Hammes, Butler Paper Corporation; blind bogey, Frank Foley, Blandamier Paper Company, low net, 17 and under, Gene Clifford and Ray George, Tomahawk Paper Company, first low net, 18 and over, George Moss, Western States Envelope Company, and James Coy, Flambeau Paper Company; second low net, 18 and over, D. C. Frisbee, Midland Paper Company and Jack Burrus, Albemarle Paper Company, low net, first nine, H. A. Fulton, Blunden Lyon Paper Company, low net second nine, Stub Early, International Paper Company, high gross foursome, Phil Howard, John Loughrin, E. Meyers and J. H. Coy; low net foursome, Stub Early, H. Montgomery, George Moss and R. H. Burnett.

### Chamber of Commerce on Unemployment

The Illinois Chamber of Commerce has offered Illinois manufacturers and wholesalers of paper a comprehensive program to follow in securing the most advantageous position under the unemployment insurance law. Included in the suggestions are (1) insofar as possible reduce the number of different people used on the payroll—particularly extras, (2) review entire personnel weeding out all employes planned for dismissal later, (3) increase versatility of employes so that they may be transferred from one activity to another instead of being laid off, (4) when placed on payroll, give employe careful physical examination and a careful appraisal of ability—all within first few weeks of employment and (5) when lay-offs are made, all other things being equal, employes to be dropped first should be those with the shortest length of service.

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## Printing House Craftsmen Meet

BOSTON, Mass., August 22, 1938—Approximately 800, including a number of the paper industry, attended the annual convention of the International Association of Printing House Craftsmen, held at the Hotel Statler August 14-17.

Arthur V. Howland, vice-president of Tileston & Hollingsworth Company, was chairman of the Budget and Finance Committee and a member of the Exhibit Committee. Howard W. Wallingford, of the same company, who is a member of the board of directors of the Boston Club of Printing House Craftsmen, Inc., was chairman of the Program and Educational Clinics Committee and a member of the Golf Committee and of the Keepsake Book Committee.

Among the sponsors of the educational features of the Convention were the John Carter Company, Carter, Rice & Co., Corporation, Storrs & Bement Company, Tileston & Hollingsworth Company, and S. D. Warren Company.

Among those contributing to the success of the Convention were Carter, Rice & Co., Corporation, Crocker-McElwain Company, General Envelope Company, Japan Paper Company, D. F. Munroe Company, Storrs & Bement Company, Tileston & Hollingsworth Company, and S. D. Warren Company.

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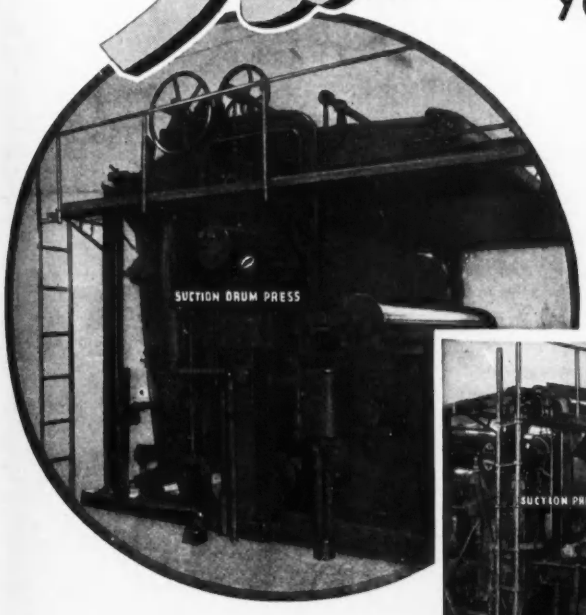


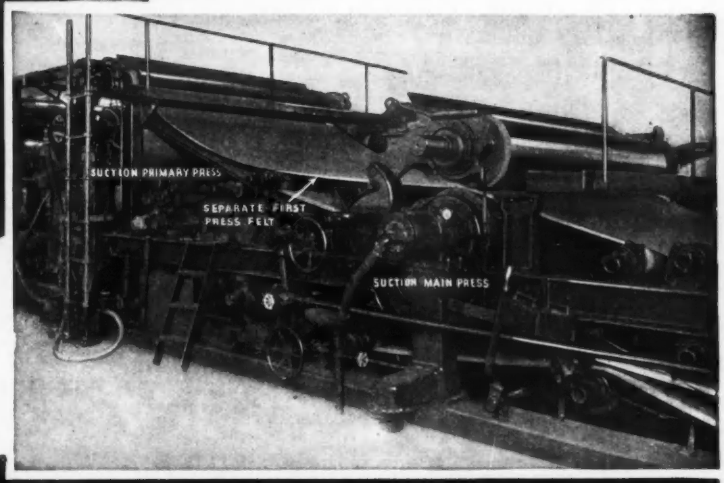


**Note the short top felt for suction drum press nip. All plain primaries have been removed.**

**Wet pickup felt returns after suction primary press. Suction first press is on separate felt.**

1. Removes large quantity water without disturbing formation or finish.
2. Reduces crushing and checking.
3. Improves finish. Reduces felt marks.
4. Permits use of light weight short top felt. Lower felt cost.
5. Eliminates several nips. Improves test of board.
6. Permits more bulk if desired.
7. Increases test or permits cheaper furnish and maintain same test.
8. Suction main press more efficient on separate felt.

* Suction drum press is equivalent to suction drum and suction primary press.

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# Toronto Looks For Improvement in Fall

## July Pick-Up Tapers Off This Month But Mills and Wholesalers Expect Definite Up-Trend In Demand Next Month — German Buyers Offer $11.50 Cord for Pulp Wood—Pulp Wood Operators Consider Wages.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., August 22, 1938—Business in the paper line picked up considerably during the month of July and it was expected that the improvement would continue. So far during the present month there has been a falling off, much to the disappointment of the mills and wholesale houses. As yet there has been no price cutting although the competition from outside sources is keen. Several sulphite lines are being offered at a very low figure. With the reaping of a generous harvest, an expected betterment in the building situation, and the opening of the Canadian National Exhibition, which is the world's largest annual fair, in Toronto next week attracting over a million and a half visitors, it is anticipated there will be a pick-up in conditions. Several manufacturing and wholesale firms will have displays at the Canadian National show and a large number of out-of-town buyers are expected to visit the city. All the mills report business as quiet and orders are not so plentiful as last month. Certain members of the distributing trade blame the excessively warm weather as the cause of diminished buying, the present month having been the hottest on record for many years, with the result that holidays have been prolonged and a disposition developed to delay orders and not undertake any new commitments. While all members of the industry say that business has declined so far in 1938 from twenty to thirty per cent in volume, there is a feeling prevailing that the trend will definitely be upward with the coming of the fall months.

### German Buyers Offer $11.50 for Pulp Wood

It is rumored that pulpwood producers in Northern Ontario have been approached by representatives of Germany for the purchase of their stock. It is said that the price being paid is $11.50 per cord which is high relative to the cost of production, but it is understood that specifications call for specialty shaved wood. According to present plans, the cut of pulpwood in Northern Ontario will not be more than one-third to one-half of last season as the Eastern mills are still heavily stocked with wood due to 40% curtailment in operations over the first few months of this year. It is expected that German interests will purchase over 200,000 cords of wood in Ontario and Quebec during the next few weeks.

### Forest Fires Burn Over 1000 Acres

Forest fires have been raging near Little Current, Gore Bay and other points in Northern Ontario. 1000 acres were burned over before the flames were extinguished at Silverwater. The fire for some time threatened the pulpwood loading operations in that vicinity, but rain came at the right moment to prevent heavy loss.

### Wages in Pulp Wood Production

A meeting of timber and pulpwood operators in the district of Fort Francis, Ontario, and of employees of various firms was held recently at Fort Francis for the purpose of considering conditions of labor prevailing in the industry and drawing up a schedule of wages, hours and days of labor. Louis Fine, Industrial Standards Acts officer, presided at the gathering and the new wage schedule will be binding upon all employers and employees.

George W. Sulman, a former member of the Ontario Legislature and former mayor of Chatham, Ont. passed away recently after a long illness. Mr. Sulman was a leading paper dealer, both retail and wholesale, and was a well known traveller, during his public career, having visited practically every known country.

### Waterway to Lake Superior for Pulp Wood

A new controlled waterway linking Long Lake in northwestern Ontario with Lake Superior is within six months of completion. The project was undertaken a year ago by the Ontario government and the Ontario Hydro Electric Power Commission. The controlled diversion of Long Lake waters is being carried out primarily to provide a waterway to Lake Superior for pulpwood. The government has estimated that it will increase by one million dollars a year the revenue from Ontario forests. The pulpwood Supply Company, granted limits in the sixty-five square mile area of the Long Lake basin, is prepared to cut one hundred thousand cords this winter to be floated down the channel next spring. The company has a long term plan for harvesting nearly five million cords in seventy-five years. The logs will be floated down the new channel cut to a depth of fourteen feet, then through the Aquasahon river to Lake Superior at Schreiber, Ont.

### Box Association Plan Golf Tournament

C. V. Hodder, secretary of the Canadian Paper Box Manufacturers' Association, Toronto, has gone on an extended business trip to British Columbia. Arrangements are now being made for the fall golf tournament among the box manufacturers. An invitation has been received from John Small, head of the Guelph Paper Box Company, Guelph, to hold the event in that city.

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## Noel E. Deane to Visit U. S. A.

Noël E. Deane, a director of George Mawson & Co., Ltd., 71 Fleet street, London, E. C. 4, England, will visit the U. S. A. during the early weeks of September and will be staying at the Roosevelt Hotel, Madison Avenue and 45 street, New York City.

George Mawson & Co., Ltd. were established in 1906 and have wide connections in England as mill representatives, importers and merchants of paper and allied products, and Mr. Deane during his stay hopes to meet any American producers who are not already represented, or who are not satisfactorily represented in the English market.

• Because EBG was the first to produce liquid chlorine in America and pioneers constantly in adapting it to new uses, the company is known among users throughout the country for the progressiveness of its spirit. Customers like the way EBG tackles a problem involving the use of liquid chlorine—its efficiency and willing cooperation. You, too, will like the EBG spirit!

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FIRST IN THE COUNTRY

# Financial News of Pulp and Paper Industry

Abitibi Power and Paper Co. Reports Earnings of $256,843 for July — Scott Paper Co. Names Underwriters of Its 30,000 Shares of $4.50 Preferred—Ruberoid Co. Takes No Action On Dividend for Third Quarter.

### NEW YORK STOCK EXCHANGE

High, Low and Last for the Week Ending August 24, 1938

| | High | Low | Last |
|---|---|---|---|
| A. P. W. | 2⅜ | 2⅜ | 2⅜ |
| Armstrong Cork Co. | 44 | 40 | 44 |
| Celotex Corp. | 25½ | 22⅞ | 25 |
| Celotex Corp., pf. | 67 | 66 | 67 |
| Certain-Teed Products Corp. | 10⅞ | 9¼ | 10½ |
| Certain-Teed Products Corp., pf. | 41½ | 35¾ | 41¼ |
| Champion Paper & Fibre Co. | 25⅞ | 25 | 25¾ |
| Congoleum-Nairn Co. | 26½ | 23¾ | 26 |
| Container Corp. of America | 16½ | 15⅞ | 16⅛ |
| Continental-Diamond Fibre Co. | 9⅜ | 9½ | 9½ |
| Crown-Zellerbach Co. | 13¼ | 12½ | 13 |
| Flintkote Co. | 24½ | 21 | 23⅞ |
| Robert Gair | 4¾ | 4⅜ | 4¾ |
| Robert Gair, pf. | 15 | 14 | 15 |
| International Paper & Power | 10¼ | 8⅞ | 10⅛ |
| International Paper & Power, pf. | 44¾ | 39 | 43½ |
| Johns-Manville Corp. | 98½ | 92½ | 96½ |
| Johns-Manville Corp., pf. | 127½ | 127 | 127 |
| MacAndrews & Forbes | 29 | 29 | 29 |
| Masonite Corp. | 57⅞ | 52 | 56¼ |
| Mead Corp. | 14⅜ | 14 | 14⅜ |
| Mead Corp., pf. | 70 | 67 | 70 |
| Paraffine Companies, Inc. | 48½ | 45¾ | 47 |
| Ruberoid Co. | 29¼ | 26½ | 27⅞ |
| Scott Paper Co. | 48½ | 47 | 48¼ |
| Sutherland Paper Co. | 29 | 28¾ | 29 |
| Union Bag & Paper Corp. | 14⅞ | 13¼ | 14½ |
| United Paperboard Co. | 7¾ | 6⅜ | 7½ |
| U. S. Gypsum Co. | 97 | 89 | 96 |

### NEW YORK CURB EXCHANGE

High, Low and Last for the Week Ending August 24, 1938

| | High | Low | Last |
|---|---|---|---|
| American Box Board Co. | 10 | 9⅛ | 10 |
| Brown Co., pf. | 28 | 23¾ | 27 |
| Great Northern Paper | 30 | 29 | 29 |
| St. Regis Paper Co. | 3½ | 3⅛ | 3½ |
| St. Regis Paper Co., pf. | 57 | 57 | 57 |
| Taggart Corp. | 6 | 5½ | 6 |

## Abitibi Earns $256,843

The Abitibi Power and Paper Company reports earnings for July after depreciation and bond interest of $256,843, compared with $522,580 for July, 1937.

Shipments of newsprint in July amounted to 22,960 tons, compared with 27,493 tons in June and 42,532 tons in July, 1937. Present indications are that August shipments will total approximately 24,000 tons.

Shipments of bleached sulphite pulp in July amounted to 2,667 tons, compared with 2,142 tons in June and 5,797 tons in July, 1937. Present indications are shipments of bleached sulphite pulp in August will total approximately 2,700 tons.

## Corrugated Box Defers Dividend

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., August 22, 1938—Business in certain lines of paper box making is quiet and the directors of the Corrugated Paper Box Company, Limited, Toronto, have decided to defer the regular quarterly dividend on the preferred stock due September 1. The volume of trade has been materially lower than in the corresponding period of last year and earnings have not been sufficient to cover the preferred dividend requirements. The directors therefore decided to postpone action until conditions in the next few months are clarified.

## Scott Paper Co. Files with SEC

WASHINGTON, August 22, 1938—Scott Paper Company filed amendment with SEC naming the following as underwriters of its 30,000 shares of $4.50 preferred stock: Smith, Barney & Co., 14,200 shares; Cassatt & Co., Inc., 7,100 shares; Janney & Co., W. H. Newbold's Son & Co. and Yarnall & Co., 2,100 shares each; Boenning & Co., 1,500 shares, and Harper & Turner, Inc., 900 shares.

Preferred shares are redeemable at 110 per share on or before August 31, 1943, and at 107 per share thereafter.

## Ruberoid Takes No Dividend Action

The Directors of Ruberoid Company took no action at its recent meeting with respect to the payment of a dividend in the third quarter of 1938, it was announced by Herbert Abraham, president.

While the company's sales in recent months have reflected the continuing upward trend of building activity, particularly in residential construction, Mr. Abraham stated, the directors decided to defer dividend action until a clearer picture could be had of sales volume and profits for the year as a whole.

## Champion Executives at Boston Meeting

BOSTON, Mass., August 22, 1938—Executives of the Champion Paper and Fibre Company attending the Annual Convention of the International Association of Printing House Crafts men were George S. Johnston, manager of the New York Sales Division; Alexander Thomson, Jr., advertising manager from the main office, Hamilton, Ohio, Summerfield Eney, of the New York office, and James Stricker, of the executive offices of the company at Hamilton. Mr. Stricker visited among the Boston trade.

## Connecticut Blower Co. Expanding

Charles H. Keeney, general manager of Connecticut Blower Company, Hartford, Conn. announces the opening of a New York office at 155 East 44th street with J. G. Stalb as district manager to cover New York City, Southern New York State, Long Island, New Jersey and Delaware.

This company also announces 5 additional sales engineers as follows: Carl E. Swift, of Holland, Mich., for the state of Michigan; John P. Gilboy, of Scranton, Pa., for the state of Pennsylvania; Martin E. Marsalis, of Fort Worth, Texas, for the state of Texas; Charles E. Kreipke, of Evansville, Ind., for the state of Indiana and Chester J. Scanlan, of Bloomington, Ill., for the state of Illinois.

All of these men have had a very broad experience and are exceptionally well qualified to represent the Connecticut Blower Company in the territories assigned.

# CONSOLIDATED AND MOSINEE FILE APPLICATIONS

(Continued from page 13)

Wisconsin Hydro Authority will produce 19,000,000 less kilowatt-hours than this figure.

### Gilbert and Kimberly-Clark Pension Plans

Recognition of long-time service and pension plans have been observed by the Gilbert Paper Company, Menasha, Wis., and the Kimberly-Clark Corporation, Neenah, Wis., for many years.

In the Gilbert organization is Fred Huband, 82 years old, who is a director as well as an employee. He helped construct the original Gilbert mill when he began work there August 1, 1887. He worked up to plant superintendent and eventually became a director. Henry Vander Hiden, who recently retired on a pension, had been with the concern 47 years.

When a Gilbert employee has served 40 years, he is presented with a gold watch, and more than fifteen have received such gifts. Any employee who attains the age of 70 and has been with the company 40 years can be pensioned. The death of any employee, except from an accident, providing he has been employed ten years or more, brings $1,000 to any named beneficiary under a plan wholly within the company, and not through any employee contribution.

In the Kimberly-Clark organization, its president, F. J. Sensenbrenner, holds perhaps the longest record of service. He will complete 50 years with the organization next year. Fred Kranhold, a member of the operating staff, has been with the company for more than 40 years. Six Dupont brothers employed in various mills of the company have a total of 101½ years of service, and their combined ages are 215 years. Thirteen employees have records of 40 years or more, and 62 exceed the 30-year mark.

Recognition gifts are given men of long service at Kimberly-Clark, and anniversary dinners are held in their honor. The company also has a comprehensive plan of pensions.

### Paper Institute Students Leave for Woods

First-year students of the Institute of Paper Chemistry, Appleton, Wis., will leave September 12 for Beachwood, Mich., where they will become lumberjacks for a woods course. Sixteen new students are enrolled, and will be given first hand instruction in wood selection, logging, and other rudimentary operations of obtaining raw materials for the paper mill. Their study will be conducted by Robert F. Rogers, special Institute lecturer in wood technology. The return trip to Appleton will be made September 21, when the Institute opens its regular fall term.

Two 4,000-cord rafts of pulp wood were brought across Lake Superior by tugs in a friendly race last week, with their destination as the Munising Paper Company, Munising, Mich. One raft is from Nipigon, Canada, and the other from Trout Bay, Canada. The total trip is 300 miles, and the tugs average one mile per hour.

### Curtis and Schroeder Nuptials

John R. Curtis, Jr., who is with the Scott Paper Company, Chester, Pa., and Miss Jeanne Meyer of Appleton, Wis., were married last week at the First Methodist church at Appleton. Mr. Curtis is a graduate of Johns Hopkins University, Baltimore, Md., and spent the last year as a special student at the Institute of Paper Chemistry, Appleton, Wis. The couple will be home after September 1 at Norwood, Pa., following honeymoon trip to Canada.

Announcement is made of the marriage August 15 of Robert Schroeder of the Kimberly-Clark Corporation, Neenah, Wis., and Miss Isabelle Whiting of Neenah, Wis., daughter of Mr. and Mrs. Frank B. Whiting. Mr. Whiting is president of the George A. Whiting Paper Company. The ceremony took place at Crown Point, Ind.

### Ward Paper Resumes Production

After a shutdown of eight months, the Ward Paper Company went into production August 17, with substantially the same crew as at the time of the last operations, according to D. B. Smith, the new general manager and secretary-treasurer. Some changes have been made in executive personnel. William Sharpless is superintendent in charge, and the company's new chemist is Walter Garding, formerly with the Wausau Paper Mills Company, Brokaw, Wis., and the Watab Paper Company, Sartell, Minn. Fifty-five employes were placed at work when the mill opened, and operations will be conducted 24 hours a day on 8-hour shifts.

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## Indianapolis Demand Improves

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., August 22, 1938—Some improvement was seen during the last week in the fine paper market, which appeared to be better situated than during the past few months. Not only was there a slight expansion in sales, but inquiries were plentiful leading jobbers to believe there will be a decided upswing by the first of the month. Books, ledgers and covers all seemed to respond to the market influence. Some of this improvement is reported to come from retailers who are laying in stocks against the opening of schools and colleges next month. These stocks were allowed to deplete almost to the vanishing point last spring and no attempt was made during the summer to make replacements. There is reported to be a good volume of direct mail business in prospect for the fall season, which is expected to be better than last year.

Jobbers report a good demand at the present time for building papers, but it is doubtful if the volume of the year will equal that of last, due to the late start in the spring. A good fall season is expected, however.

Summer specialties continue to be leading sellers. Tissues, plates, cups and all other wares are in good demand and likely will continue until after Labor Day when there likely will be little more buying and retailers will devote most of the remaining time to reducing their stocks.

Container factories are working part time and production is being held down to balance demand. There has been no effort to build up large warehouse stocks and likely none will be made until the economic situation becomes a trifle clearer.

Paper stock men report only a fair mill demand with prices showing no change. Good grades of both paper and rags seem to be most wanted.

# Obituary

## Adam Wilkinson

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, August 22, 1938—Adam Wilkinson, 55, for eighteen years labor advisor of the paper manufacturers throughout the Connecticut Valley, died at his home 201 Pleasant street, August 19. His health failed several years ago but he remained active at times. His most recent strenuous campaign culminated a few months ago when after several months of negotiations, a new working agreement was signed between the manufacturers and the three locals of papermakers in this section.

Mr. Wilkinson had a colorful career in labor circles starting to work at the age of nine years in the coal mines of Newcastle, England. He worked in coal mines in this country and eventually became an international officer of the United Mine Workers union and a close friend of John L. Lewis and William Green.

He was a member of the Labor Board during the World War under former-President William Howard Taft. In 1920, George Galliver, then president of the American Writing Paper Company and also a member of the Labor Board, brought Mr. Wilkinson to Holyoke as labor commissioner of the company. In addition to serving the American Writing Paper Company he became labor advisor for most of the paper mills in this section. He retired from the company last year and opened offices as a general labor advisor.

He was a former trustee of the Holyoke Lodge of Elks, continued his membership in the United Mine Workers union and the American Pulp and Paper associates.

The funeral took place today with large representations of paper mill officials of this district, and large delegations from various labor and fraternal organizations. He leaves a widow and two children.

## Henry T. Brown

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., August 22, 1938 — Henry Tatnall Brown, 67, president of Brown & Bailey Company, paper box manufacturers, died August 16 in Pennsylvania Hospital, Philadelphia, from complications which followed an abdominal operation.

Mr. Brown was vice-chairman of the American Friends' Service Committee and a member of the Philadelphia Chamber of Commerce. He also served as a member of the board of the Philadelphia Criminal Justice Association. In 1919, as head of the Friends' Service Committee, he went to Germany and directed the feeding of starving children there.

Born in Wilmington and educated in the Friends' School at Westtown, Mr. Brown entered the business founded by his father, Robert Pittsfield Brown, rising to its presidency in 1923. At the time of his death he also was treasurer of the firm.

Surviving are his widow and three sons, Henry T. Brown, Jr., dean of Haverford College; Robert Pitfield Brown, 2d, and Ernest Lancaster Brown.

## German Paper Industry Expands

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 24, 1938—Recent official statistics indicate that in the three-year period, from 1935 to 1937, German manufacture of paper and paper products expanded considerably, although it failed to regain the volume attained in 1929, according to a report from the office of the American Consulate, Cologne. Moreover, it was only in 1937 that the increase in value of exports of paper and paper products surpassed that of the rise in quantity, indicating an actual improvement in prices had taken place.

While the German paper industry has not yet succeeded in raising exports to the desired level, manufacturers are nevertheless pleased with the progress made during the past few years in the face of keen foreign competition and other obstacles. They are particularly gratified that in 1937 export prices likewise improved. Some pessimism has been expressed, however, regarding the maintenance of exports in 1938. If exports for the first 4 months of the current year are compared with the same period in 1937, a considerable decrease is already evident.

## Handy Reference Paper Book

The Metropolitan Paper and Bag Corporation, 227 Sixth avenue, New York, has just printed a manual for the paper man, which is of rather an unusual character. It gives full information on the basic weights of paper, twines, tissues, etc., and also gives the customary packing, yardage and tensile strength. In addition it gives a full outline of all papers used and their respective names as known in the trade and also their prevailing prices.

It should prove a very useful pamphlet for every salesman as it gives him useful information which he may constantly have on hand.

Paper concerns may obtain gratis a copy of this pamphlet for each salesman on their staff.

## Bid for Government Papers

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 24, 1938—The Government Printing Office has received the following bids for 29,100 pounds (150.000 sheets) of 20 x 30 drumhead manila paper: Mudge Paper Company, 14.85 cents; Barton, Duer & Koch Paper Company, 8 cents; Stanford Paper Company, 13.08 cents; and Cromwell Paper Company, 7.75 cents less 2 per cent.

## Fine Paper Men Meet in Boston

BOSTON, Mass., August 22, 1938—A meeting of the Fine Paper Division of the New England Paper Merchants Association was held Friday at the Boston Chamber of Commerce, with Chairman John H. Brewer presiding. The subject of discussion was the coming National Sales Crusade.

## TAPPI Fall Meeting Speaker

The fall convention committee of the Technical Association of the Pulp and Paper Industry has announced that the main speaker at the banquet to be held on Friday evening, September 9, at Green Bay, Wis., will be C. A. Dykstra. Dr. Dykstra is president of the University of Wisconsin and was formerly city manager of Cincinnati, Ohio.

## Engineering Papers at Green Bay Meeting

At the fall convention of the Technical Association of the Pulp and Paper Industry to be held at Green Bay, Wis., September 8-10, 1938 there will be four technical sessions.

Beginning at 9:45 A.M. Thursday, September 8th the following program will be offered.

"A New Conductivity Instrument and Method of Analyzing Kraft Liquors", by E. R. Whittemore, S. I. Aronovsky and D. F. J. Lynch, U. S. Agricultural By-products Laboratory, Ames, Iowa.

"The Absorption of Sulphur Dioxide in Water" by Charles Reilly, Kimberly-Clark Corporation, Neenah, Wis.

"Latest Development in Water Softening-Carbonaceous Zeolite" by Ray Riley, The Permutit Company, New York, N. Y.

"Common Sense Mill Control" by C. K. Boyer, Interlake Div., Consolidated Water Power and Paper Company, Appleton, Wis.

The afternoon program will be devoted to the consideration of a number of papers presented by staff members of the Forest Products Laboratory, Madison, Wis. This list was published in the trade press several weeks ago.

The Friday morning program will consist of five papers (also previously announced) by the staff and students of the Institute of Paper Chemistry, Appleton, Wis.

The Saturday morning program is devoted to engineering subjects and are as follows:

"Data on Heat Exchanger Performance" by B. F. Smith and H. A. DuBois, Kimberly-Clark Corporation, Neenah, Wis.

"Steam Generation for Paper Mills" by M. H. Kuhner, Riley Stoker Corporation, Worcester, Mass.

"Economics of High Pressure Steam" by A. Kolflat, Sargent and Lundy, Chicago, Illinois.

Provisions have been made to visit the pulp and paper mills of Green Bay and the Fox River Valley as well as the Institute of Paper Chemistry. Although there will be no official visit to the Forest Products Laboratory at Madison, Wis., those attending the meeting will be welcome at the Laboratory at any time that they can find it convenient to make such a visit.

## New Pages on ADSCO Heat Economizers

Manufacturers using hot water for processing work will be interested in the new pages that have been added to the ADSCO Bulletin No. 35-76 on ADSCO Heat Economizers.

By running the hot condensate from the return lines through an ADSCO Heat Economizer to preheat the domestic cold water supply, it is possible to secure full heat value from the steam and at the same time provide all or an additional amount of hot water for domestic or processing purposes.

The bulletin illustrates two of the many heat economizer applications and contains two charts—one whereby the amount of economizer heating surface can be determined and another that indicates the final temperature of the domestic water after pressing through the economizer, based on varying condensate inlet temperatures. A copy of Bulletin No. 35-76 may be obtained by addressing the American District Steam Company, North Tonawanda, N. Y.

## Pacific TAPPI Arranges Winter Program

Following the practice of the past year the Pacific Section of the Technical Association of the Pulp and Paper Industry will hold a series of dinner meetings in various pulp and paper centers as follows: October 4 at Portland, Ore.; November 8 at Everett, Wash.; January 10 at Port Angeles, Wash.; February 7 at Tacoma, Wash.; March 7 at Camas, Wash,; April 4th at Seattle, Wash.; May 2 at Vancouver, B. C. In June the annual and joint meeting with the Superintendents Association will be held at a place to be decided later.

At each meeting there will be one technical paper and a talk on some general business subject relating to the industry. Anyone planning to visit the West Coast will be welcome to attend these meetings and if interested in speaking should notify W. T. Webster, Vice Chairman, St. Regis Kraft Corporation, Tacoma, Washington.

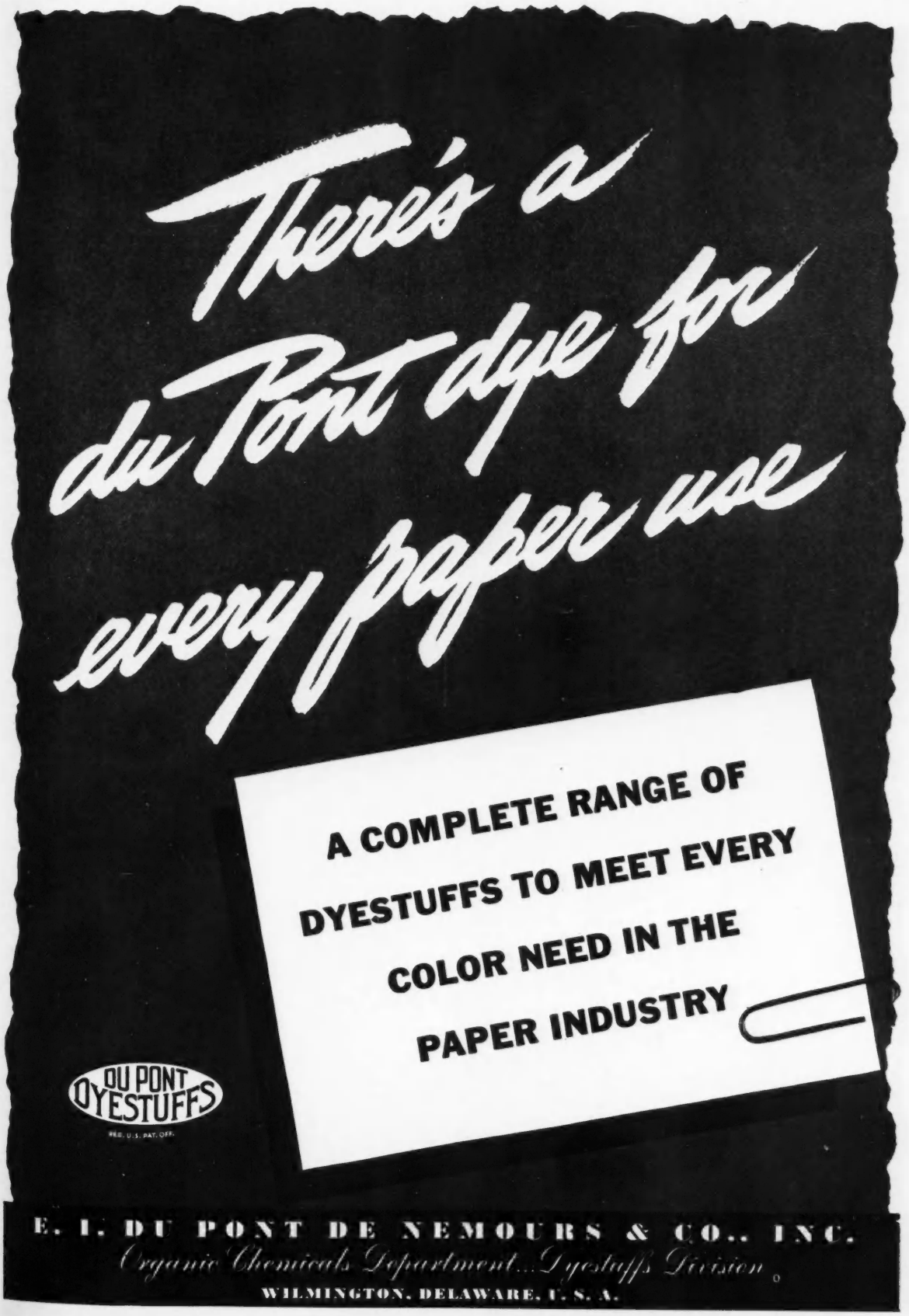
### Shibley Award

To encourage the younger men in the industry to present papers at the dinner meetings the Pacific Section of TAPPI will offer a prize of fifty dollars for the best paper presented at one of these meetings during the coming season by a man actively working in a pulp or paper mill of the Pacific Coast and who has not previously presented a paper at a Section meeting. This idea was first suggested by the late Kenneth Shibley and the prize will be known as the Shibley Award.

All papers must be submitted to the Vice Chairman of the Pacific Section in quadruplicate and will be judged by the officers and executive committee of the Section on the following points: (1) the amount of interest shown at the meeting where the paper is presented; (2) manner of presentation; and (3) the technical value of the paper. The judges will reserve the right to select the papers to be submitted from those submitted. Papers may be on any subject dealing with some phase of the pulp and paper industry. Engineering or chemical subjects will be particularly welcome.

## Albany Terminal Filled With Pulp

Albany, N. Y., August 22, 1938—With about 30,000 tons of wood pulp stored at the local port terminal it was announced that virtually all available covered space has been exhausted. The Port Commission has already notified shippers that after this week shipments will have to be placed outside and it was stated that plans are under way to take care of future demands for space as business warrants. Officials are now studying the requirements of the pulp trade in an effort to determine where new storage facilities should be built and the approximate dimensions. A new warehouse was constructed last fall and there is a possibility of applying to the P. W. A. for aid in expansion plans. It was announced that the pulp has not moved out of storage as rapidly as in other years because of trade conditions and a similar crowded situation is being experienced at other Atlantic ports. Several ships with cargoes from Sweden docked here within the past few weeks and others are scheduled to arrive in the near future. Shipments to the port for the year are reaching expectations with indications that a new record will be made.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## Rogers Change of Personnel

E. G. Mansfield, formerly vice-president and treasurer of Samuel C. Rogers & Co., was recently elected president of the company, pioneer manufacturers of automatic knife and saw grinding machinery. Mr. Mansfield has been actively identified with the business for 25 years. He succeeds Oliver Cabana, Jr., permanent Buffalo industrialist and banker, who died early this year.

The other officers are Oliver F. Cabana, vice-president, and Arthur F. Moul, reelected secretary.

Samuel C. Rogers & Co. have been making knife

E. G. MANSFIELD

grinders and saw sharpeners for over 50 years and sell to the metal trade, steel mills, printing, paper, paper box, furniture, tobacco, milling, wood working plants, saw mills and other industries. Their products are also in use in many South American, South African, Far Eastern and European countries.

Mr. Mansfield states that the company is now making plans for anticipated increase in business during the fall and winter, and says, "There has been a steadily increasing flow of inquiries from all parts of the country during recent months. Gradual growth of sales may be expected in our field which should lead to a material expansion in sale volume for 1939. We are optimistic."

## New Paper Lacquer

A new paper lacquer which is moisture-proof has been developed by E. I. du Pont de Nemours & Co.

Designed primarily for use on packages, the new lacquer affords a protective film which is impermeable to water vapor.

Its purpose is to prevent moisture from entering into packaged goods which should be kept dry, and similarly to retain the desired quantity of moisture in those which should be moist.

Aside from its protective features, the lacquer adds brilliance to colors on labels. It prevents offsetting and smearing of inks on labels of products which must be packaged while hot. It is resistant to scuffing and scratching and can be made to resist alcohol, greases and other reagents.

## Raw Material Shortage in Germany

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 17, 1938—Marked shortage of raw materials is a serious problem to the German paper industry. A reduction in foreign exchange quotas seriously reduced imports of wood pulp and other raw materials. To compensate for such reduction, domestic wood, chiefly fir and beech, is to be used on a much wider scale. Present plans also call for the erection of additional wood pulp mills in Germany, and more straw pulp is also to be manufactured.

Statistics show that in 1937 between 3,200,000 and 3,500,000 metric tons of straw were converted into cellulose in Germany. The present plans call for an increase in these amounts to 7,500,000 metric tons. This will necessitate the erection of mills with an average productive capacity of 80,000 to 100,000 metric tons annually in various parts of the country easily accessible to the straw supply. By enlisting the aid of the Hitler Youth organizations throughout Germany it is also hoped that collections of waste paper will yield materially larger returns. In addition to the shortage of wood pulp, other materials used in the manufacture of high-grade paper such as rosin and textile fiber are becoming ever scarcer. Some relief from the present situation is expected to be afforded by the greater use of Austrian wood pulp and other raw materials which will now be included in the German production.

## Geo. W. Sisson Jr. Speaks on Paper

POTSDAM, N. Y., August 22, 1938—George W. Sisson, Jr., of the Racquette River Paper Company, discussed the aspects of the papermaking industry here this week at a gathering of prominent business men. He declared that the industry has drifted South and West where the costs of wood, production and labor are lower but that we have successfully competed with them by manufacturing distinctive specialties such as embossed paper, printing, waxing, oiling and plate finishing, of which quality is more important than price. The basic processes of papermaking have changed little in the past 2,000 years, he said. The process was kept secret for centuries until taken by the Arabs who in turn gave it to the Moors in Spain whence it spread through Europe. The only major change in the process was made about 150 years ago, he stated, when the Fourdrinier process was introduced and the only changes since that time have been in improving the technique. He concluded by saying that over 1,500 people in this area are directly dependent upon the Racquette River Paper Company and over 50,000 tons of freight enter and leave the plant by rail through this place each year.

## Associated Box Plant Burns

ELWOOD, Ind., August 22, 1938—Fire of undetermined origin swept through part of the Associated Box Corporation plant here, resulting in damage estimated at $40,000. Approximately $25,000 worth of machinery was destroyed. Much other machinery had been removed recently from the plan which is being dismantled and moved East. Fire doors prevented spread of the blaze to offices and other sections of the factory.

"THERE'S A REAL *Quality Story* BEHIND THESE GULF OILS!"

GOOD CRUDES, refined by modern methods, make fine lubricating oils—oils that prove their quality in industry's machines. Performance in actual service is the real test of any product, including oils and greases.

Yet Gulf research engineers have not been content with the usual service tests for Gulf's higher quality lubricants. They have devised laboratory instruments which punish oils far more severely than any machine in industry . . . instruments that find ways to make oils oxidize and break down. As a result of these tests, Gulf engineers then develop oils with such characteristics that they can stand far greater punishment than they will ever receive in normal service. Thus users are assured of oils that possess a "margin of safety" well beyond average requirements.

There's a real quality story behind Gulf oils and greases. Let a Gulf engineer demonstrate to you—on the job—how Gulf's higher quality lubricants provide a greater measure of protection for your equipment—and help you reduce maintenance and repair expense.

*Here is one of the machines Gulf's technical men have devised for testing lubricating oils. The oil, mixed with water, is circulated rapidly through the machine while a stream of oxygen is whipped thoroughly into it. Many oils have been tested with this instrument but none have shown stability equal to Gulf's higher quality oils.*

GULF INDUSTRIAL LUBRICATION

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GENERAL OFFICES, PITTSBURGH, PA.

# CONSTRUCTION NEWS

*A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills*

## General Construction News

**Andover, Conn.**—A new company has been organized to take over the former local mill of the Case Fiber Company, Inc., and will continue operations for a similar line of output, including counter board, shank board, innersole board and kindred fiber products for shoe production. Extensive operations are planned. The output of the mill will be sold by the Pratt Paper Company, 136 Federal street, Boston, Mass.

**Richmond, Va.**—The duPont Rayon Division, E. I. duPont de Nemours & Co., du Pont Building, Wilmington, Del., manufacturer of cellulose rayon products, has approved plans for new addition to mill at Ampthill, near Richmond, making the fifth unit at the plant. It will comprise a large one and multi-story structure, equipped for extensive increase in present production, and estimated to cost close to $1,000,000, with machinery. Work will be carried out by day labor under the direction of the company engineering department. Completion is scheduled early in 1939.

**New York, N. Y.**—The Kenwood Paper Box Corporation, recently organized with capital of $10,000, plans operation of a local plant for the manufacture of paper boxes and containers. New company is represented by Joseph H. Ginsberg, 353 Stone avenue, Brooklyn, N. Y., attorney.

**Chester, Pa.**—The Scott Paper Company, manufacturer of tissue paper stocks, is having plans prepared by Stone & Webster Engineering Corporation, 49 Federal street, Boston, Mass., engineer and contractor, for proposed new addition to mill, recently referred to in these columns. Bids are scheduled to be asked at early date for foundations for new building, to be equipped with a paper-making machine and auxiliary equipment to increase present capacity about 16 per cent. Structure will be one and multi-story tvpe and will occupy site formerly used by the Alpha Boat Club, a tract of land secured by company for the expansion. An award for reinforced-concrete and sheet piling, with piers, has been let to the J. E. Brenneman Company, North American Building, Philadelphia, Pa. New addition is estimated to cost approximately $3,000,000, with equipment and financing has been arranged in that amount.

**Los Angeles, Cal.**—The Western Candy Box Company, 1243 East 63rd street, manufacturer of stiff paper boxes and containers, plans rebuilding of portion of plant, recently destroyed by fire. Loss estimated close to $40,000, with equipment. Reconstruction is expected to cost approximately a like amount.

**Menominee, Mich.**—The Hoskin Paper Company, manufacturer of kraft and other paper stocks, will begin work at early date on new filter plant at mill, to be one and two-story, 55 x 95 feet, estimated to cost about $40,000, with equipment. Bids for building erection will be asked soon. An award for filter equipment has been made to the Norwood Engineering Company, Florence, Mass. L. A. De Guere, Wisconsin Rapids, Wis., is consulting engineer.

**St. Louis, Mo.**—The Scharff-Koken Manufacturing Company, 7901 Michigan avenue, manufacturer of corrugated boxes and containers, has begun erection of new addition to plant, recently referred to in these columns. It will be one-story, 60 x 100 feet, with extension 40 x 40 feet, estimated to cost close to $50,000, with equipment. Increased capacity will be carried out. General contract for construction is being carried out by the Fruin-Colnon Contracting Company, Merchants' Laclede Building, St. Louis.

**Indianapolis, Ind.**—The Indianapolis Blue Print & Lithograph Company, 34 South Pennsylvania street, manufacturer of processed paper products, has leased additional floor space in building at location noted and will occupy for increased capacity. Work will be placed under way at once. S. H. Clendenin is president.

**Roanoke, Va.**—The American Viscose Corporation, manufacturer of viscose rayon products, is increasing production to a capacity basis at local mill, following curtailment for a number of months, and the fifth unit at the plant is being placed in service. A full working force of about 4300 persons will be employed for an indefinite period. H. C. Neren is manager at the mill.

**Chicago, Ill.**—The Illinois Paper Tablet and Stationers, Inc., 569 West Van Buren street, recently organized, plans operation of a paper converting plant for the manufacture of tablets and other commercial specialties. M. Englehart is one of the incorporators of new company, which is represented by Jack Rosen, 160 North La Salle street, Chicago.

**Syracuse, N. Y.**—The Syracuse Container Corporation, 911 Hiawatha boulevard East, manufacturer of corrugated fiber boxes and containers, has awarded general contract to the Universal Building and Construction Company, 218 West Fay-

ette street, Syracuse, for new addition to plant, recently referred to in these columns, and will proceed with erection at early date. It will be one-story, to be used in part for storage and distributing division, and is estimated to cost about $45,000, with equipment. A. Goldsmith is company architect in charge. Company is a subsidiary of the Robert Gair Company, 155 East Forty-fourth street, New York.

**Charlotte, N. C.**—The Carolina Paper Board Company, manufacturer of paper board and kindred paper products, has superstructure under way for a new reinforced-concrete mill at the rear of 528 Turner avenue, to be one-story, 80 x 220 feet, estimated to cost over $60,000, with machinery. Equipment installation is now being arranged and work will begin on installation as soon as the building is ready for occupancy, early in the fall. As previously noted in these columns, erection contract has been let to E. L. Bass & Brothers Construction Company, 708 Bainbridge street, Richmond, Va.

**Bogalusa, La.**—The Louisiana Boganite Corporation has awarded general contract to Caramella Brothers, Bogalusa, for a new one-story clay refining plant on local site on avenue F, South, for the production of material for paper service and allied purposes. It will be one-story, 40 x 300 feet, and will be equipped for a capacity of about 100 tons of refined clay per day. Work will be placed under way at once. Mark P. Seirsdale is president.

### New Companies

**New York, N. Y.**—The A.B.C. Manufacturing Corporation has been organized with capital of 200 shares of stock, no par value, to manufacture stiff paper boxes and other paper containers. New company is represented by the Albany Service Company, 315 Broadway, New York.

**New York, N. Y.**—The Liberty Paper Stock Company, Inc., has been chartered with capital of $20,000, to deal in paper products of various kinds. New company is represented by Gabriel Rubino, 60 Broad street, New York, attorney.

**New York, N. Y.**—The Park-Sunbeam Folding Box Company, Inc., has been incorporated with capital of 200 shares of stock, no par value, to manufacture and deal in folding paper boxes and other paper containers. New company is represented by Tashof & Smith, 80 Broad street, New York, attorneys.

**Buffalo, N. Y.**—The Standard Manufacturing & Color Card Corporation has been organized with capital of $15,000, to manufacture and deal in paper goods of various kinds. New company is represented by Marc W. Comstock, 39 Erie street, Buffalo, attorney.

## Sutherland Paper Co. To Build

KALAMAZOO, Mich., August 22, 1938—Announcement by L. W. Sutherland, president of the Sutherland Paper Company, of a contract let for a new building to house additional converting equipment, brings a total of $600,000 in plant improvements in the Kalamazoo Valley for this week.

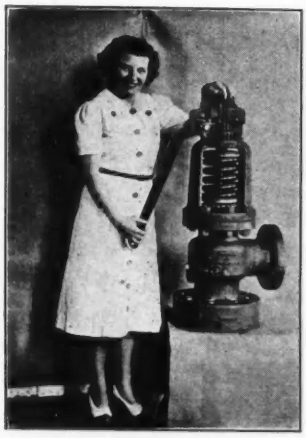
The new addition containing 90,000 square feet will be erected directly north of the Standard Division and will be one of the most modern plants of its kind in the state. Board specialties including paper plates, pails and ice cream cans will be manufactured in the new plant. The congested condition in the Standard Division will be materially relieved and only products made from roll stock will be converted in this new building. Rolls will enter by overhead conveyors to the automatic machines, then by moving belts to the packing department and from there on overhead tracks to the storage or directly into cars or trucks.

The structure will be a one story type building with 40 x 60 clear spans of the monitor type construction. Exterior is redface brick, full glass area 10 feet high around the building. Roof of pre-cast cement tile overlaid with insulation and built up roofing. The front of the building will have a 113 foot enclosed truck dock space with a 100 foot concrete driveway. The rear will have the car loading dock 200 feet long. The building will be air conditioned and 100 per cent fireproof. An automatic sprinkling system will protect the contents. Latest types of rest rooms for male and female employees with individual lockers, will be installed.

The Miller-Davis Company has been awarded the contract and the new addition will be ready for occupancy shortly after the first of the year. The estimated cost is $180,000.

## Consolidated's 2500-Lb. Safety Valve

The Consolidated Safety Valve Division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn., announces the completion of a new line of safety valves for elevated pressures and temperatures (2500 pounds at 1000 degs. F.).



These new valves are to be installed on the highest pressure commercial steam boiler ever built in this country (over 2200 pounds W.S.P.).

Special alloy steels with low coefficients of expansion have been selected for the bodies, bonnets, springs and trim so that these valves will provide the same safe performance at this new high in operating conditions that is regularly produced in safety valves for 300 pound boilers. Bodies and bonnets are assembled with through bolts to prevent "freezing" at high temperatures. The trim of these valves is treated stainless steel. Constant seat diameter is insured by a new type of bevel seat in which the actual contact bearing between the seat and disc is always at the lowest portion of the seat surface. The single ring type of blowdown control is used. Note the thickness of the inlet flange, which is the new 2500 pound standard.

The builders state that this valve is a continuation of the development cycle started 80 years ago when their company produced safety valves to protect the boilers used to run the first steam engines built in America. In 1926, the makers claim they installed the country's first high pressure boiler for developing and testing valves for contemplated high pressure jobs.

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**COMING EVENTS IN THE PAPER INDUSTRY**

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY. Fall meeting, Northland Hotel, Green Bay, Wis., September 8-10.

NATIONAL PAPER TRADE ASSOCIATION. Fall convention, Stevens Hotel, Chicago, Ill., September 19-21.

## BAD METHODS AND TAXES

It is plainly inevitable that every one must continue to expect to pay higher and higher taxes to support the rapidly increasing cost of Federal Government. When all the administrative and executive bureaus and services are conducted on a moderately efficient basis—for no political influenced organization can be expected to function with the higher rate of efficiency common to well managed private business enterprises,—there can be no complaint. But when the cost of Federal Government reaches the all-time high record of the present year, it is a matter of grave concern.

When the United States Treasury closed its books at the end of its fiscal year on June 30, it showed a net deficit for the year of $1,459,000,000. Net expenditures were $7,701,000,000, or $300,000,000 less than in 1937, but even with this reduction the total was almost double the annual expenditures in the pre-depression years. Receipts totaled $6,242,000,000 or nearly one billion dollars more than last year. Expenditures for the year were at the approximate rate of $14,600 a minute, while revenues were collected at the rate of $11,862 a minute, resulting in a deficit of $2,800 a minute. This marked the eighth consecutive year of the Roosevelt Administration in the red and the spending is continuing at an accelerated rate during the ninth year. This lavish spending policy is without precedent and while the forecast of higher taxes for next year is regarded as a certainty, there is a possibility that at least one form of bad taxation which has lowered the income of workers and so retarded recovery, may be changed.

The present set-up and administration of the Social Security Act is a bad taxation method and like the surplus profits tax which was one of the major causes of the current depression, the Social Security Act should be amended to put the law on a sounder basis. This pay-roll tax taken from the pockets of employers and employees put approximately two billion dollars in the Treasury since its enactment and has returned less than a quarter of a billion dollars. Up to the end of the last fiscal year referred to, the Federal Government had collected $708,000,000 in such taxes. What became of this money and all that had been collected since the pay-roll tax had been in effect? According to a survey of the Government's fiscal position by the National Economy League, less than $6,000,000 has been used to pay benefits under the act. All the rest has gone into a "general fund" of the Treasury from which it has been paid out as fast as received to meet general governmental expenditures, such as farm relief, battleships, WPA theatre projects, salaries in the civil service and for many other purposes, unrelated to social security. All the Federal Government has done is to acknowledge the debt by issuing 3 per cent notes, which it has deposited in the "Old-Age Reserve Account."

The promise of the Federal Government to pay and its ability to pay is the only "reserve" back of this old-age security plan. It is this form of taxation which has taken so much money from workers and employers to provide the Government with cash and bring the actual cash budget nearer balance, that is blamed by the Government's own economists as contributing an important part in causing the new depression of the present time.

The word "reserve" is improperly used in designating this fund. It is not a reserve of cash or an investment which is earning money for the Government. The cash has already been spent and the notes issued in return are merely I.O.U.'s payable to the Government. The Government can derive no income from it any more than a business man can derive income from a promissory note payable to himself. This practice is deceptive and the law should be changed to prevent money collected in the name of security for old age being spent for any of the thousand-and-one purposes, as is now the case.

The inability of the Roosevelt Administration to formulate any definite plan for balancing the budget must continue to create doubt and a feeling of lack of confidence in the present fiscal policy of the Administration. With a balanced budget, security taxes would be less burdensome if the money was used to retire outstanding securities in the hands of investors. If this was done the Government would be able to resell these securities and use the money to meet the payment of old-age pensions. As things now stand, there can be no funds in the Old-Age Reserve Ac-

count for the payment of old age annuities when they fall due in the future and funds for that purpose must be raised over again by some new form of taxation.

Like the former undivided surplus profits tax which proved to be a brake on business recovery, the Social Security Act should be changed to an honest law and administered on a practical current-cost plan, such as has been in force in Great Britain for many years.

## Selection of Heart-Free Wood

Improved technique developed at the Forest Products Laboratory, U. S. Forest Service, Madison, Wis., makes less imperative careful selection of heart-free wood, heretofore a requisite for light-colored, bleachable sulphite pulp from such woods as Douglas fir, jack pine, and the southern pines. Wood containing considerable amounts of heartwood of the above species have produced satisfactory pulps by using the standard sulphite process under special conditions involving the use of high liquor concentration, extended penetration periods, and low temperatures in cooking the wood. These measures have tended to minimize the adverse influence of the heartwood, and in repeated instances gave satisfactory pulps from the standpoint of both yield and quality.

Although the results thus far obtained require further study to determine their full value both from a technological and economic point of view, they are considered particularly encouraging in view of the eventual possibility of making sulphite pulps suitable for highgrade papers, rayon, and other derivatives from heart-containing Douglas fir and pines.

## L. O. Rolleston Gets Patent

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., August 22, 1938—Lancelot O. Rolleston, of this city, has been awarded a patent on an apparatus for the manufacture of soluble cellulose, according to announcement last week. Application for patent was made to the government in 1932. Several claims of unique features for the invention were allowed. The patent has been assigned for manufacturing purposes to the International Paper Company. Technically described, the apparatus comprises a treating tank adapted to retain a liquid, a conveyor arranged at an angle within said tank, and means for directing a sheet of said material onto said conveyor, said conveyor being adapted to retain the material within the liquid during a portion of its travel and to carry material out of the liquid.

## Now Carroll Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

The Tayloe Paper Company, 420-424 South Front street, Memphis, Tenn., announces that the name of its branch house, which it has for a number of years operated at Jackson, Tenn., under the name of Martins-Currie Paper Company, has been changed to the Carroll Paper Company. Gentry C. Carroll, one of the vice-presidents of the Tayloe Paper Company, has been appointed manager of the Carroll Paper Company.

## Production Ratio Report

(These statistics are based upon paper production reports to the American Paper and Pulp Association.)

COMPARATIVE MONTHLY SUMMARIES

| Months | 1938(c) | 1937(c) | 1936 | 1935 | 1934 |
|---|---|---|---|---|---|
| January | 63.9% | 90.3% | 76.1% | 65.8% | ..... |
| February | 68.7% | 90.1% | 77.9% | 70.0% | ..... |
| March | 69.6% | 90.3% | 76.0% | 70.5% | ..... |
| April | 68.3% | 92.1% | 82.3% | 70.0% | ..... |
| May | 69.0% | 90.6% | 81.6% | 69.4% | ..... |
| June | 65.8% | 87.3% | 80.7% | 72.3% | ..... |
| July | 71.9% | 81.8% | 77.3% | 64.9% | ..... |
| August | ..... | 82.9% | 81.5% | 70.9% | ..... |
| September | ..... | 78.6% | 80.5% | 71.9% | 58.2% |
| October | ..... | 73.5% | 87.6% | 75.6% | 64.7% |
| November | ..... | 61.9% | 88.0% | 75.3% | 61.7% |
| December | ..... | 54.5% | 85.9% | 71.2% | 59.6% |
| Year Average | ..... | 80.6% | 81.3% | 70.5% | ..... |
| First 32 weeks | 68.5% | 88.5% | 78.9% | 69.0% | ..... |

COMPARATIVE WEEKLY SUMMARIES

| CURRENT WEEKS, 1938 | | CORRESPONDING WEEKS, 1937 | |
|---|---|---|---|
| *July 9 | 58.7% | July 10 | 69.8% |
| *July 16 | 75.6% | July 17 | 87.6% |
| *July 23 | 76.2% | July 24 | 85.9% |
| *July 30 | 77.3% | July 31 | 83.9% |
| *August 6 | 73.2% | August 7 | 82.6% |
| *August 13 | 75.8% | August 14 | 82.1% |

The following statistics show the number of mills reporting by raio groups:

| | Number of Mills Reporting, Current Weeks | | | | | |
|---|---|---|---|---|---|---|
| Ratio Limits | July 9, 1938 | July 16, 1938 | July 23, 1938 | July 30, 1938 | Aug. 6, 1938 | Aug. 13, 1938 |
| 0% to 50% | 130 | 84 | 77 | 87 | 78 | 62 |
| 51% to 100% | 179 | 224 | 230 | 216 | 202 | 147 |
| Total Mills Reporting | 309 | 308 | 307 | 303 | 280 | 209 |

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported by individual companies.

### PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours", were as follows:

| Mos. | (e) 1938 | (e) 1937 | 1936 | 1935 |
|---|---|---|---|---|
| Jan. | 55% | 80% | 61% | 61% |
| Feb. | 61% | 86% | 67% | 67% |
| Mar. | 60% | 87% | 68% | 67% |
| Apr. | 57% | 89% | 70% | 61% |
| May | 58% | 86% | 68% | 61% |
| June | 56% | 75% | 68% | 65% |
| Week end. July 9, 1938—37% | | | | |
| Week end. July 16, 1938—60% | | | | |
| Week end. July 23, 1938—65% | | | | |

| Mos. | 1938 (e) | 1937 (e) | 1936 | 1935 |
|---|---|---|---|---|
| July | 67% | 69% | 59% | |
| Aug. | 74% | 75% | 65% | |
| Sept. | 70% | 76% | 69% | |
| Oct. | 66% | 82% | 76% | |
| Nov. | 56% | 79% | 70% | |
| Dec. | 46% | 74% | 60% | |
| Week end. July 30, 1938—64% | | | | |
| Week end. Aug. 6, 1938—64% | | | | |
| Week end. Aug. 13, 1938—65% | | | | |

(e) Basic figures revised to include new members of the National Paperboard Assn.

## Kalamazoo Paper Co. to Spend $400,000

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., August 15, 1938—Alfred E. Courtenius, president of the Kalamazoo Paper Company has announced that the board of directors of his company has approved a modernization program of an estimated cost of $400,000. It includes the purchase of a new paper machine at an approximate cost of $250,000, together with the other equipment necessary for its operation. The order for the new machine has been placed with the Rice Barton & Fales Company, of Worcester, Mass., for delivery around December 1. It will be installed in Mill No. 1. Some extension of the building will be necessary to accommodate the new equipment. The old machine which is being replaced has been in continuous service for over thirty years and President Courtenius stated it was still in excellent condition. The installation will be done in January and February, most of the work will be done by the regular employees. No additional financing was necessary by the company to carry out the new project.

# HERE'S WHAT "THEY" SAY...

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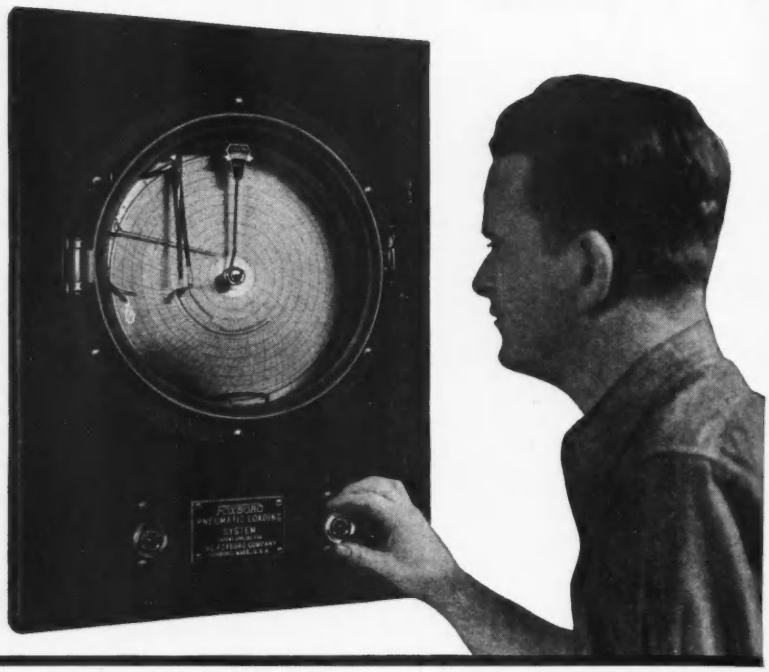

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**CONTROLLED PNEUMATIC LOADING**

Section of the Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

# Review Of The Paper Industry Literature

Abstracts Compiled By the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman.

**Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.**

## Cellulose and Lignin

**Constitution of the Macromolecular Substances Rubber and Cellulose.** Chem.-Ztg. 62, no. 13: 117-119 (Feb. 12, 1938); B. I. P. C. 8:278.—The article is essentially a review of the author's theories on macromolecular chemistry to show the connection between the constitution of high molecular substances, their physical properties, and their influence upon the technological results.—C.J.W.

**Identification of Hydrocellulose and Oxycellulose.** Ciba Review 1, no. 7: 229-230 (March, 1938); B. I. P. C. 8:278.—There being no specific test for hydrocellulose, its presence in cotton yarns is assumed when a positive test is obtained with reagents sensitive to both hydrocellulose and oxycellulose and a negative test with reagents sensitive to oxycellulose alone. The following specific tests for the presence of oxycellulose in cotton yarns are given: Tin-gold reaction, Prussian Blue reaction, Nessler's reagent, and Cochineal reaction. —C.J.W.

**Chemical Modification of Cellulose.** Louis E. Wise. Trans. Electrochem. Soc. 73, 15 pp. (preprint) (1938). — Hydrocelluloses are water-insoluble mixtures resulting from the acid degradation of cellulose. The degradation is caused by the hydrolysis of glucosidic linkages in the macromolecule. This involves a shortening of the "chains", i.e., the production of fragments having a lower average molecular weight than that of the untreated cellulose. Acid treatment also serves to decrease lateral cohesion between these fragmented "chains", with resulting slippage and a great decrease in tensile strength. With progressive acid attack, there is also a progressive increase in copper number, an increase in solubility in cold 10 per cent sodium hydroxide, and in fluidity, all of which indicate a lower average molecular chain length. "Hydrocellulose" is a mixture. To the best of our knowledge, no chemical individual "hydrocellulose" has been isolated or identified. The term "Oxycellulose" refers to any mixture (obtained by the mild oxidation of cellulose) insoluble in cold water. It cannot be sharply characterized, but two extreme types of oxycellulose have been noted. Some of the difficulties in correlating tensile strength with copper numbers or with viscosity are outlined. Brief reference is made to the use of zincates and beryllates in connection with sodium hydroxide in increasing the solubility range of oxycelluloses.—A.P.-C.

**Refractive Indices of Cellulose. I. Ramie, Cotton, and Cotton Linters.** K. Atsuki and S. Okajima. J. Soc. Chem. Ind. Japan 40: 360-362B (1937).—The refractive indices of ramie, cotton, and cotton linters were measured by Becke's method in directions parallel and perpendicular to the fiber axis. The values for cotton and linters were irregular and when measured parallel to the axis they increased as the length of a convolution increased, becoming equal to that of ramie (1.595) when this length was infinite.—A.P.-C.

**Effect of Various Carbohydrate Materials on the Determination of Lignin by the Fuming Hydrochloric Acid Method.** Max Phillips and M. J. Goss. J. Assoc. Official Agr. Chem. 21: 140-145 (Feb., 1938).—The action of 42 to 43 per cent and of 5 per cent hydrochloric acid on various carbohydrates was studied in relation to the Goss and Phillips method of determining lignin (*J. Assoc. Official Agr. Chem.* 19, 341-350 (1936)). Insoluble humin-like materials were obtained only in the case of fructose, sucrose, inulin and pectin, the percentages of insoluble material being, however, much less than those recorded in the literature. It is pointed out that the preliminary extraction of the plant material with hot water and 1 per cent hydrochloric acid would remove effectively any of the interfering carbohydrates, thus preventing them from interfering appreciably with the determination.—A.P.-C.

**The Hydrolysis of Willstatter Lignin From Wheat Straw.** Max Phillips. J. Assoc. Official Agr. Chem. 21: 145-148 (Feb., 1938). — When Willstätter lignin from wheat straw was subjected to alternate treatment with cold fuming hydrochloric acid and boiling 5 per cent hydrochloric acid, a portion of the lignin complex as a whole was hydrolyzed, as shown by the fact that the per cent methoxyl in the residual lignin remained the same as in the original lignin.—A.P.-C.

# A Reflectance Method for the Study of Discoloration of Artificially Aged Papers*

By John C. Tongren [1]


## Abstract

*The discoloration of sized and unsized papers from chemical wood pulps has been studied on a quantitative basis by measuring heat aging effects with the General Electric Reflection Meter. Reflectivity measurements made on handsheets after successive intervals of oven aging at a definite temperature were found to be most advantageously expressed as the K/S number, according to optical relationships developed by Kubelka and Munk. A linear relation was found to exist between the K/S number and the square root of the hours a sample had been aged at a given temperature. The numerical value of the slope of this curve in the above terms was taken as a measure of the rate of discoloration upon aging. With the aid of this principle the influence of rosin size in discoloring handsheets has been measured. The effect of natural resin, the degree of bleaching, and bleach residues in discoloring sheets of the unsized pulp have been similarly studied. The influence of the relative humidity of the aging atmosphere on the rate of discloration of unsized sheets has likewise been investigated.*


Most of our common papers prepared from chemical wood pulps will, after a period of time in storage, exhibit a deterioration in color, which often develops into a definite yellowing The pulps used rarely consist of pure cellulose, but usually contain varying amounts of wood substances as impurities, and not infrequently they contain quantities of degraded celluloses produced through overcooking or too drastic bleaching. The rosin size and alum added to make paper satisfactory for use with writing inks may be looked upon as necessary impurities. The discoloration of paper is ascribed broadly to oxidation of the natural impurities in the sheet, of the sizing materials, and of the cellulose itself. Some of the causes of paper discoloration will be dealt with in this study, which has as an additional objective the development of a method whereby the rate of discoloration may be determined.

## Historical Survey

Reviews of the literature concerning the deterioration of paper have been compiled by Walton (*23*) and by Bardeen (*4*). Significant portions of these papers have been included with other references in the following survey. It should be mentioned that, although heat aging tests have been used to a great extent in paper permanence investigations, the latter have been concerned in the main with variation in physical strength, and to a somewhat less degree with the measurement of discoloration.

Among the first to study the discoloration of paper was Herzberg (*10*), who cited as one source of deterioration the substitution of rosin for animal sizing. Cross (*6*) suggested that paper is attacked by atmospheric oxygen, and that this oxidation is attended by disintegration and discoloration of the paper. It was reported by Evans (*8*) that the products of combustion of illuminating gas were often the cause of the yellowing of paper. Discoloration during normal storage, he continued, is proportional to the amount of rosin in the sheet, or, more generally, to the rosin and the conditions employed for fixing it.

Paper from absolutely pure cellulose will not discolor and will last indefinitely without discoloration, in the opinion of Klemm (*13*). He believed that all wood-free papers turned yellow when sized with rosin. This yellowing or light aging he attributed to light-sensitive soaps in the paper, these soaps consisting of iron in combination with the organic acids of rosin. Later (*14*) he suggested that the intensity of the discoloration is generally proportional to the amount of iron present.

Atmospheric oxygen or acid residues were believed by Schoeller (*19*) to destroy the ultramarine coloring matter, permitting the return of the natural yellow color of the paper. Within the limits of commercial practice, the presence of iron or iron resinate was found to have little effect. Discoloration due to the action of atmospheric oxygen on rosin is very slight, but rosin does develop a darker color on standing due to polymerization or auto-oxidation. Schoeller claimed that this polymerization could be accomplished by treating the rosin with bleaching powder, and that a rosin so treated would not increase the rate of discoloration of paper.

Klason (*12*) believed that rosin, when exposed to light, absorbed oxygen very rapidly, to form first an active peroxide and then an inactive dioxide much darker than the original rosin. Apart from the presence of mechanical wood pulp in paper, rosin size is the sole cause of discoloration, according to Zschokke (*25*). The color change is due to light and heat, while atmospheric oxidation affects the reaction but slightly. It may, he continued, be safely assumed that a paper containing less than one per cent of rosin will not discolor seriously with age. Yellowing of paper is due to auto-oxidation of chemical or mechanical impurities in the cellulosic material, in the opinion of Haas *(9)*. He recommended iron-free alum and bleached rosin for sizing, although he questioned the suitability of ordinary bleaching powder for treating the rosin.

The reasons for the yellowing of chemical wood pulp listed by Aribert and Bouvier (*3*) were: excessive cooking, traces of free acid or free chlorine, resin, and iron resinates. Sindall *(21)* said that rosin size acts indirectly to reduce the quality of the paper by reason of the changes produced in the rosin by sunlight. The yellowing of bleached pulp occurs

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y., Feb. 21-24, 1938.

A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the Degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., June, 1937.

[1] Member TAPPI. Hammermill Paper Company, Erie, Pa.

when bleach chemicals have not been completely removed by washing, according to Schwalbe and Wenzl (*20*). Zhereboff (*24*), studying the effect of light upon sizing quality, found detrimental effects to be caused by the violet and blue rays. He also found that these rays also destroyed cellulose compounds in the chemical pulps. Compounds of ferric iron are adsorbed more readily by the cellulose fiber than are ferrous compounds according to Oeman (*17*), and the ferric compounds are the more harmful to the color of paper. Alum containing up to one half of one per cent ferric iron is, however, not harmful to white paper, in his belief.

Minor (*16*) offered as an explanation of the destructive aging of finished paper the continued breakdown of the forces binding the molecules together, and suggested that this action is brought about or aided by light, air, moisture, traces of iron and manganese, and bleach residues. Marini (*15*) believed the most harmful agents involved in oxidation during the storage of paper are light, heat, and air. The bodies in the paper responding most readily to these influences are lignones, iron salts, and rosin. Aitken (*1*) felt that the acid pulping process did not remove certain harmful constitutents associated with the fiber, and that these bodies undergo changes which lead to deterioration and discoloration in the paper.

Both bleached and unbleached rosin darken under a carbon arc according to the findings of Kimberley and Hicks (*11*). Ferrous iron present in concentration as low as one part per million proved harmful to the color of the rosin when exposed to the rays of the arc.

## Experimental Methods

### Preparation of Sized Handsheets

All sized sheets were made on the Williams sheet-making equipment, which includes an electrically driven agitator, a 9.5 by 11.5 inch removable wire sheet mold having a 100 mesh wire, a hydraulic sheet press, and a thermostatically controlled sheet drier. Sheets were made to correspond to the basis weight of 20 pounds for a ream size of 17 x 22 inches, 500. Wet pulp, previously prepared according to a standard method in a laboratory beater, was weighed out in quantity sufficient to make ten sheets of finished weight as above specified. The pulp was defibered and diluted to exactly one per cent consistency in a butter churn of eight quart capacity. The rosin size in the form of a three per cent solution was slowly added from a graduated pipette to the pulp suspension, which was constantly agitated. Five minutes after the addition of the rosin a three per cent solution of alum was introduced to the suspension in quantity sufficient to reduce the *p*H to 4.5.

Sized stock equivalent to the desired weight of a finished sheet was weighed out, diluted to 0.2 per cent consistency with water at a *p*H of 4.5, and thoroughly mixed by means of the agitator. The suspension was poured into the sheet mold, previously filled to a specified mark, eddy currents were quieted with a wire frame, and the water leg was drained. A new white blotter, a couch blotter and a wool felt were placed in the order named upon the wet web, which was then transferred to the press. A pressure of five pounds per square inch applied for one minute made it possible to remove the web on its blotter backing from the wire. Blotters and felt were similarly placed on the exposed side of the web which was finally pressed at 300 pounds per square inch for one minute. All but one blotter were removed from the pressed sheet, which was then placed on the drier for fifteen minutes. At the end of this time the smooth, uncockled sheet could be readily stripped from the blotter backing.

### Preparation of Pure Abietic Acid

Abietic acid for sizing was prepared from commercial G gum rosin according to the method used by Robinson (*18*). The rosin was refluxed with glacial acetic acid, and the hot solution was filtered into a crystallizing dish. The crude yellow acid which separated upon cooling the solution was filtered off and washed repeatedly with 85 per cent ethyl alcohol. The crude product was recrystallized twice from absolute alcohol to give the purified abietic acid in small white needles. The acid number was found to be 185.6, as compared with the theoretical value of 185.2 (assuming a monobasic acid). The abietic acid, as well as the rosins, was saponified with chemically pure sodium carbonate, the resulting soap being diluted with distilled water to a transparent 3 per cent solution. Alum for fixing the size was applied in the form of a 3 per cent solution of chemically pure aluminum sulphate in distilled water.

### Oven-Aging Procedure

The paper samples were suspended near the top of a well-insulated electric oven, whose inside dimensions were 15 by 12 by 10 inches. A fan inside the oven could be adjusted to blow directly upon the samples or to deflect warmed air to them from the oven walls. Since the paper samples for aging were seldom larger than about two inches square, the variable temperature conditions often encountered when aging large samples of paper were avoided. The temperatures were controlled within 1 to 1.5 deg. C.

### Measurement of Reflectivity

The reflectivity values of the papers were determined by means of the General Electric Reflection Meter, which is commonly known as the "brightness tester". The reflection meter is described and its operation is discussed by Davis (*7*). The precision required of the instrument for this work was maintained by carefully checking the calibration of the instrument against the master instrument at The Institute of Paper Chemistry.

### Other Methods

Test sheets from unsized pulps were made in accordance with TAPPI Standard Method T 205 M-36, and were dried under tension at room temperature. Other TAPPI Standard Methods used were: T 408 M-36 for the determination of rosin retention, T 203 M-36 for alpha cellulose, and T 430 M-36 for copper number. Lignin was determined by the Modified Forest Products Laboratory method.

## Discussion of Experimental Results

### A. Study of Discoloration Produced in Rosin Sized Handsheets by Artificial Aging

Optical measurements depending upon the reflectance, under specified conditions, of light from the fibrous sheet were employed to observe the effects of artificial aging upon paper. The reflectance of

an opaque pile of paper is preferably known as the reflectivity, which term will be used in this report. Since the reflectivity of the sheet is determined by the reflecting power of the fibers in it, a change in the reflectivity would indicate that the fibers had been modified to a certain extent by some agent or condition.

In view of the fact that the literature indicates rosin size as the strongest influence in the discoloration of paper, it is advisable to introduce this study by comparing the behavior upon aging of papers sized with rosin and those which contain no rosin. Accordingly, three sets of handsheets were prepared as follows: one set was sized with the relatively dark reddish brown G gum rosin, one set with an equal amount of pale yellow N wood rosin, and one set of the unsized fiber was used as blanks. Analysis indicated that 0.83 per cent of the G rosin and 0.89 per cent of the N rosin were present in the sized sheets (oven dry basis). Samples cut from the sheets were aged at 70, 90, and 110 deg. C., and the reflectivities were determined after each aging interval. The data are given in Table I.

Reference to Table I indicates that the decreases in reflectivity, $\Delta R_\infty$, for the three samples are very nearly alike at a given aging temperature. Since this is true, any curves from these data relating $R_\infty$ or $\Delta R_\infty$ and time are found to be almost identical in form, although the differences in the original reflectivities, $R_\infty$, for sized and unsized samples prevent the curves from being actually superimposed. The question may also arise as to whether it is permissible to compare, unit for unit, the reflectivity changes of samples whose original reflectivities are markedly different, for example, an unsized sample having an original $R_\infty$ of 80.0 and a sized sample whose original $R_\infty$ is 75.5 per cent.

As a sheet is progressively heat aged it darkens in color from the original white to a gray and later to a dull yellow. With this change in hue there is, theoretically, a change in the absorptive capacity of the sheet for light rays. It is conceivable, then, that measurements in terms of the light absorbing capacity of the sheet might provide more satisfactory means of following mathematically the progress of aging discoloration. It is probable that the mass of substances responsible for discoloration varies with the light absorption coefficient more linearly than with reflectivity. In this connection there arose the

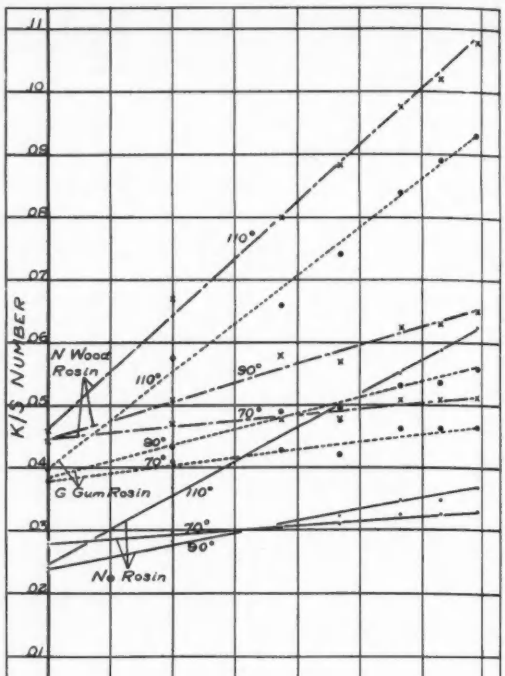


FIG. 1.

**Kubelka and Munk Number K/S for Sized Handsheets Against √Root Time of Oven Aging.**

TABLE I.—LOSS OF REFLECTIVITY OF SIZED AND UNSIZED HANDSHEETS WHEN OVEN AGED AT VARIOUS TEMPERATURES

$T$ = Hours Aged.

70 DEG. C.

| | | No Rosin | | | G Gum Rosin | | | N Wood Rosin | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | $\sqrt{T}$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ |
| 0 | 0.00 | 79.0 | 0.0 | 0.0279 | 75.5 | 0.0 | 0.0398 | 74.4 | 0.0 | 0.0440 |
| 4 | 2.00 | 78.4 | 0.6 | 0.0298 | 75.2 | 0.3 | 0.0409 | 73.7 | 0.7 | 0.0469 |
| 14 | 3.74 | 78.1 | 0.9 | 0.0307 | 74.7 | 0.8 | 0.0428 | 73.5 | 0.9 | 0.0478 |
| 22 | 4.69 | 78.0 | 1.0 | 0.0310 | 74.9 | 0.6 | 0.0421 | 73.5 | 0.9 | 0.0478 |
| 32 | 5.66 | 77.5 | 1.5 | 0.0327 | 73.9 | 1.6 | 0.0461 | 72.8 | 1.6 | 0.0508 |
| 39 | 6.25 | 77.5 | 1.5 | 0.0327 | 73.9 | 1.6 | 0.0461 | 72.8 | 1.6 | 0.0508 |
| 48 | 6.93 | 77.4 | 1.6 | 0.0330 | 73.8 | 1.7 | 0.0465 | 72.7 | 1.7 | 0.0513 |

90 DEG. C.

| | | No Rosin | | | G Gum Rosin | | | N Wood Rosin | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | $\sqrt{T}$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ |
| 0 | 0.00 | 80.6 | 0.0 | 0.0233 | 76.0 | 0.0 | 0.0379 | 74.4 | 0.0 | 0.0440 |
| 4 | 2.00 | 78.9 | 1.7 | 0.0282 | 74.6 | 1.4 | 0.0432 | 72.8 | 1.6 | 0.0508 |
| 14 | 3.74 | 77.6 | 3.0 | 0.0323 | 73.2 | 2.8 | 0.0491 | 71.3 | 3.1 | 0.0578 |
| 22 | 4.69 | 77.6 | 3.0 | 0.0323 | 73.1 | 2.9 | 0.0495 | 71.5 | 2.9 | 0.0568 |
| 32 | 5.66 | 76.8 | 3.8 | 0.0350 | 72.3 | 3.7 | 0.0531 | 70.4 | 4.0 | 0.0622 |
| 39 | 6.25 | 76.8 | 3.8 | 0.0350 | 72.2 | 3.8 | 0.0535 | 70.3 | 4.1 | 0.0627 |
| 48 | 6.93 | 76.1 | 4.5 | 0.0375 | 71.7 | 4.3 | 0.0559 | 69.9 | 4.5 | 0.0648 |

110 DEG. C.

| | | No Rosin | | | G Gum Rosin | | | N Wood Rosin | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | $\sqrt{T}$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ |
| 0 | 0.00 | 80.4 | 0.0 | 0.0239 | 75.5 | 0.0 | 0.0398 | 74.1 | 0.0 | 0.0453 |
| 4 | 2.00 | 76.3 | 4.1 | 0.0368 | 71.4 | 4.1 | 0.0573 | 69.5 | 4.6 | 0.0669 |
| 14 | 3.74 | 74.7 | 5.7 | 0.0428 | 69.7 | 5.8 | 0.0659 | 67.2 | 6.9 | 0.0809 |
| 22 | 4.69 | 73.6 | 6.8 | 0.0473 | 68.2 | 7.3 | 0.0741 | 65.9 | 8.2 | 0.0882 |
| 32 | 5.66 | 71.9 | 8.5 | 0.0549 | 66.6 | 8.9 | 0.0838 | 64.5 | 9.6 | 0.0977 |
| 39 | 6.25 | 71.1 | 9.3 | 0.0587 | 65.8 | 9.7 | 0.0889 | 63.9 | 10.2 | 0.1020 |
| 48 | 6.93 | 70.4 | 10.0 | 0.0623 | 65.2 | 10.3 | 0.0929 | 63.1 | 11.0 | 0.1079 |

possibility of applying the formula announced by Kubelka and Munk (*14a*). This formula relates the light absorbing and scattering coefficients of the sheet with reflectivity.

*The Kubelka and Munk Equation*

This reflectivity relationship has been discussed and the fundamental equations again presented by Steele (*22*). The general equation for reflectivity is:

$$R_\infty = 1 + K/S - \sqrt{(K/S)^2 + 2K/S} \quad (1)$$

Solving for $K/S$, one obtains:

$$K/S = (1 - R_\infty)^2/2R_\infty, \quad (2)$$

in which $K$ is the absorption coefficient, $S$, the scattering coefficient, and $R_\infty$, the absolute reflectivity of the sheet. From equation (2) it is seen that for any reflectivity, $R_\infty$, there exists a value of the ratio $K/S$, which will be referred to hereafter as the Kubelka and Munk number. The Kubelka and Munk numbers corresponding to the reflectivities for the first experiment are also given in Table I.

In seeking a linear relationship to adequately represent discoloration rates, various methods were employed in plotting the values $K/S$ against time. It was found that when the Kubelka and Munk numbers were plotted as ordinates and the square roots of the times of aging as abscissae a straight line relationship resulted. The data of Table I expressed in this way are shown graphically in Fig. 1. To obtain a measure of the rate of discoloration, that is, the rate of change of the reflectivity, the slopes of the curves were computed in terms of $K/S$ and $\sqrt{T}$* Table II contains the numerical values of the slopes.

TABLE II.—SLOPES OF AGING CURVES FOR ROSIN SIZED HANDSHEETS OVEN AGED AT 70, 90, AND 110 DEG. C.

| | Slope of Aging Curve (Hrs. — ½) | | |
|---|---|---|---|
| | 70 deg. | 90 deg. | 110 deg. |
| No Rosin ..... | 0.0008 | 0.0017 | 0.0056 |
| G Gum Rosin ..... .... | 0.0010 | 0.0026 | 0.0076 |
| N Wood Rosin ..... | 0.0010 | 0.0030 | 0.0090 |

At the temperature of 70 deg. C., the curves show such slight effects that their slopes merit little attention. The trends indicated by the curves for aging at 90 and 110 deg. C. are noteworthy. It is evident that the presence of the rosin causes definite acceleration in the so-called discoloration rates of the sized sheets. It is likewise interesting to note that in this range the numerical values for the slopes are approximately trebled for a 20 deg. C. rise in aging temperature.

*Reproducibility of Data*

A series of handsheets was prepared from the standard pulp and sized with 3 per cent (oven dry basis) of specially purified abietic acid and 3 per cent of chemically pure aluminum sulphate. The sized sheets contained 1.25 per cent abietic acid on the oven dry paper. Three sample pads were made up from these sheets taken at random, and three similar pads were chosen from unsized sheets for blanks. The aging data are contained in Table III.

The reflectivity measurements agree ordinarily within 0.5 point, with comparatively few differences of 0.7 point for a set of three samples. This corresponds to a 6 to 7 per cent maximum difference in the values of the Kubelka and Munk number; the average difference between pairs of samples is more nearly half this figure. The slopes of the curves are listed in Table IV. The average increase in slope for the sized sheets over the unsized is numerically equal to 0.0023, corresponding to an average increase in slope of 35 per cent.

*Influence of Increasing Amounts of Rosin Determination of Aging Rates*:

Handsheets prepared according to the standard

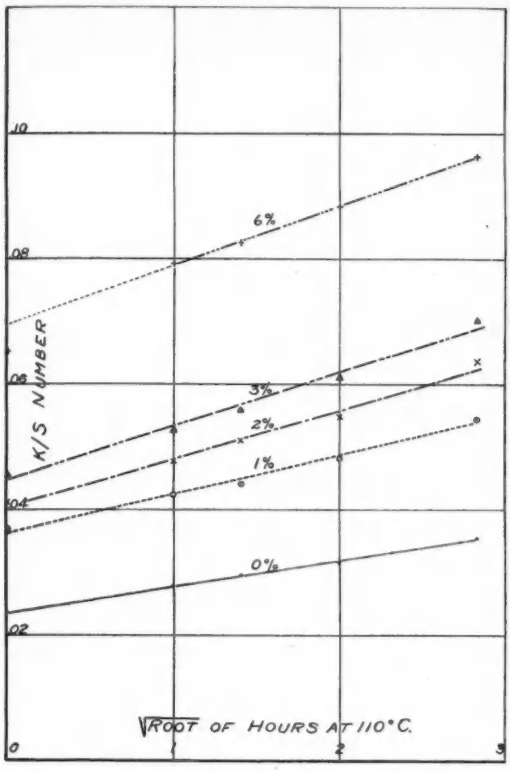


FIG. 2.

Kubelka and Munk Number K/S for Handsheets Sized with Increasing Amounts of G Gum Rosin Against √Root Time of Oven Aging at 110 deg. C.

* Actually, of course, the rate would be the slope of the curve giving $K/S$ as a function of time. The true rate is by no means constant. According to the curves of Fig. 1, the true rate begins at an enormous value, then falls off rapidly with increasing time. At any given time, the slopes of the several curves of $K/S$ vs. $\sqrt{T}$ are in the same proportion as actual rates of change. The advantages of linear plots are self-evident.

TABLE III.—REPRODUCIBILITY OF REFLECTIVITY DATA FOR SIZED AND UNSIZED HANDSHEETS OVEN AGED AT 110 DEG. C.

$T$ = Hours Aged.

| Sample No. | | Unsized | | | | | | | | | Contain 1.25% Abietic Acid | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | | 2 | | | 3 | | | 1 | | | 2 | | | 3 | | |
| $T$ | $\sqrt{T}$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ | $R_\infty$ | $\Delta R_\infty$ | $K/S$ |
| 0 | 0.00 | 79.5 | 0.0 | 0.0264 | 79.2 | 0.0 | 0.0273 | 79.1 | 0.0 | 0.0276 | 75.8 | 0.0 | 0.0386 | 76.0 | 0.0 | 0.0379 | 75.2 | 0.0 | 0.0409 |
| 2 | 1.41 | 76.0 | 3.5 | 0.0379 | 75.6 | 3.6 | 0.0394 | 75.9 | 3.2 | 0.0383 | 72.8 | 3.0 | 0.0508 | 73.0 | 3.0 | 0.0499 | 72.5 | 2.7 | 0.0522 |
| 5 | 2.24 | 75.2 | 4.3 | 0.0409 | 74.6 | 4.6 | 0.0432 | 74.9 | 4.2 | 0.0421 | 71.2 | 4.6 | 0.0582 | 71.7 | 4.3 | 0.0559 | 71.0 | 4.2 | 0.0592 |
| 7 | 2.65 | 74.8 | 4.7 | 0.0424 | 74.1 | 5.1 | 0.0453 | 74.5 | 4.6 | 0.0436 | 70.5 | 5.3 | 0.0617 | 70.9 | 5.1 | 0.0597 | 70.3 | 4.9 | 0.0627 |
| 9 | 3.00 | 74.0 | 5.5 | 0.0457 | 73.3 | 5.9 | 0.0486 | 73.6 | 5.5 | 0.0473 | 70.1 | 5.7 | 0.0638 | 70.2 | 5.8 | 0.0633 | 69.6 | 5.6 | 0.0664 |
| 13 | 3.61 | 72.8 | 6.7 | 0.0508 | 72.5 | 6.7 | 0.0522 | 72.6 | 6.5 | 0.0517 | 69.0 | 6.8 | 0.0696 | 69.0 | 7.0 | 0.0696 | 68.4 | 6.8 | 0.0730 |
| 16 | 4.00 | 72.5 | 7.0 | 0.0522 | 71.9 | 7.3 | 0.0549 | 72.3 | 6.8 | 0.0531 | 68.3 | 7.5 | 0.0736 | 68.5 | 7.5 | 0.0724 | 67.8 | 7.4 | 0.0765 |

TABLE IV.—SLOPES OF AGING CURVES FOR HANDSHEETS SIZED WITH PURE ABIETIC ACID WHEN OVEN AGED AT 110 DEG. C.

| Sample | Slope of Aging Curve (Hrs. $^{-1/2}$) Unsized | Sized |
|---|---|---|
| 1 | 0.0065 | 0.0087 |
| 2 | 0.0068 | 0.0092 |
| 3 | 0.0064 | 0.0089 |

method were sized with 1, 2, 3, and 6 per cent of G gum rosin. Averaged aging data for these papers are given in Table V and are graphed in Fig. 2. The immediate, outstanding effect of the addition of size and alum in the furnish is the large initial decrease from the reflectivity of the original pulp to that of the sized sheet. Increasing the rosin content accelerates the rate of discoloration of the sheets as shown by the slope values in Table VI. From the rapid rise of the curve, one may readily see the wisdom of using just enough rosin size to give the required size test.

TABLE VI.—SLOPE OF AGING CURVES FOR HANDSHEETS SIZED WITH G GUM ROSIN WHEN OVEN AGED AT 110 DEG. C.

| Rosin Added per cent | Added Rosin in Sheet per cent | Slope of Aging Curve (Hrs. $^{-1/2}$) |
|---|---|---|
| 0 | 0.00 | 0.0044 |
| 1 | 0.43 | 0.0062 |
| 2 | 1.09 | 0.0078 |
| 3 | 1.49 | 0.0084 |
| 6 | 2.49 | 0.0093 |

*Determination of Absorption and Scattering Coefficients:*

To ascertain the extent to which $K$ and $S$ as individual quantities vary, additional relationships in the paper of Steele (*22*) were employed. From these relationships it is possible to determine any one of the following values, given the other two: 1. the reflectance of an infinite pad of sheets, $R_\infty$ (the reflectivity); 2. the reflectance of a single sheet over black, $R_b$; 3. the reflectance of a single sheet over white, $R_{0.98}$. Another series of curves makes it possible to determine the value of the quantity $SX$, the product of the scattering coefficient and sheet caliper, when $R_b$ and $R_\infty$ are known. The absorption coefficient denoted by $K'$, when represented as $K' = KX$, may be readily calculated if $KX$ is expressed as $K/S \cdot SX$. To supply the numerical values for the latter terms it is necessary to measure at least $R_{0.98}$ in addition to $R_\infty$. For the purpose of illustration, data have been chosen from Table V.

The reflectivity $R_\infty$ was determined in the usual manner on the reflection meter, while $R_{0.98}$ was measured on the same instrument by determining the reflectance of single sheets backed with a smooth-

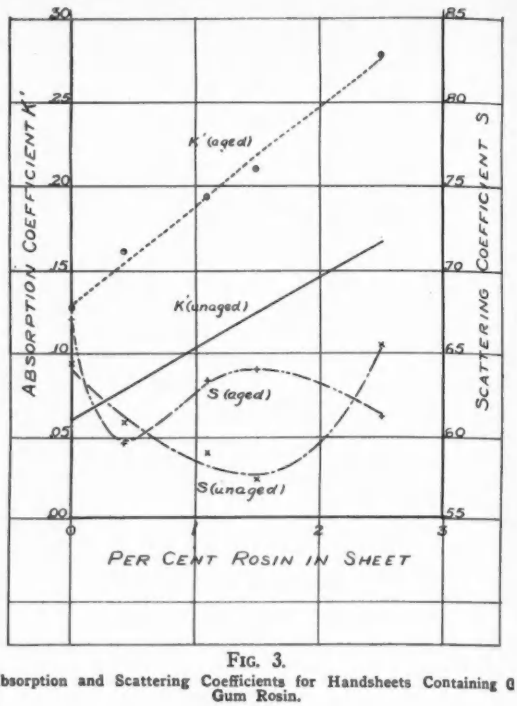


FIG. 3.
Absorption and Scattering Coefficients for Handsheets Containing G Gum Rosin.

ly surfaced block of magnesium carbonate. For an unsized sheet, $R_\infty$ was 80.5 and $R_{0.98}$ was 88.9 Under these conditions $R_b$ is found from the appropriate curves to be 67.5. Knowing $R_\infty$ and $R_b$, the value of $SX$ is read from the second series of curves as 2.38. Accordingly, the Kubelka and Munk number $K/S$, equal to 0.0236 when $R_\infty$ is 80.5, multiplied by $SX$, in this instance equal to 2.38, gives as the product, 0.0561, the absorption coefficient, $K'$. The quantity $SX$, 2.38, divided by the caliper of the sheet $X$ (which we have expressed arbitrarily as points x 10), 3.7, gives as the quotient 0.643, the scattering coefficient, $S$. Table VII contains the data for the coefficients, while their relation to the amount of rosin in the sheet is shown in Fig. 3.

Reference to Fig. 3 indicates that the absorption coefficient, $K'$, increases regularly with increasing amounts of rosin in the sheet. This increasing absorptive capacity of the sheet for light rays is significantly greater after the sheets have been aged than

TABLE V.—VARIATION IN THE KUBELKA AND MUNK NUMBER FOR HANDSHEETS SIZED WITH INCREASING AMOUNTS OF G GUM ROSIN WHEN OVEN AGED AT 110 DEG. C.

$T$ = Hours Aged.

| Rosin Added, per cent / Added Rosin in Sheet, per cent | | | 0 / 0 | | 1 / 0.43 | | 2 / 1.09 | | 3 / 1.49 | | 6 / 2.49 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | $\sqrt{T}$ | | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ |
| 0 | 0.00 | | 80.5 | 0.0236 | 76.3 | 0.0368 | 75.2 | 0.0409 | 74.0 | 0.0457 | 69.8 | 0.0653 |
| 1 | 1.00 | | 79.0 | 0.0279 | 74.9 | 0.0421 | 73.5 | 0.0478 | 72.4 | 0.0526 | 67.3 | 0.0793 |
| 2 | 1.41 | | 78.5 | 0.0294 | 74.4 | 0.0440 | 72.8 | 0.0508 | 71.7 | 0.0559 | 66.8 | 0.0825 |
| 4 | 2.00 | | 77.8 | 0.0317 | 73.4 | 0.0482 | 71.9 | 0.0549 | 70.6 | 0.0612 | 65.9 | 0.0882 |
| 8 | 2.83 | | 76.6 | 0.0357 | 72.0 | 0.0544 | 70.2 | 0.0633 | 68.9 | 0.0702 | 64.7 | 0.0963 |

TABLE VII.—EFFECT OF OVEN AGING AT 110 DEG. C. UPON ABSORPTION COEFFICIENT K' AND SCATTERING COEFFICIENT S FOR ROSIN SIZED HANDSHEETS

| Rosin Added per cent | Added Rosin in Sheet per cent | Unaged $R_\infty$ | Unaged $R_{0.98}$ | Unaged $R_b$ | Unaged $K'$ | Unaged $S$ | Aged 20 Hours $R_\infty$ | Aged 20 Hours $R_{0.98}$ | Aged 20 Hours $R_b$ | Aged 20 Hours $K'$ | Aged 20 Hours $S$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.00 | 80.5 | 88.9 | 67.5 | 0.0561 | 0.643 | 74.0 | 80.3 | 65.5 | 0.1270 | 0.670 |
| 1 | 0.43 | 75.5 | 84.3 | 65.5 | 0.0945 | 0.608 | 69.1 | 76.3 | 62.3 | 0.1610 | 0.596 |
| 2 | 1.09 | 74.6 | 83.5 | 64.5 | 0.0981 | 0.590 | 67.3 | 73.9 | 61.7 | 0.1930 | 0.633 |
| 3 | 1.49 | 73.5 | 82.3 | 64.0 | 0.1079 | 0.573 | 66.6 | 72.3 | 61.7 | 0.2095 | 0.640 |
| 6 | 2.49 | 69.8 | 76.0 | 64.1 | 0.1711 | 0.655 | 62.3 | 66.9 | 58.8 | 0.2798 | 0.612 |

before. It is to be noted that the values of the scattering coefficients, $S$, are irregular in trend and are confined within rather narrow limits, in contrast with the steady increase in the values of the absorption coefficients, $K'$.

*Influence of Purification of the Sizing Material on Discoloration Tendency*:

Handsheets were sized with increasing quantities of the neutral sodium soap of the abietic acid prepared from G gum rosin. Slopes of the aging curves for these sheets are given in Table VIII. Aging rates of the sheets are compared with those for sheets containing G gum rosin by plotting the log of the slope x $10^3$ of the aging curves against the size contents, expressed as the log of [1 + (per cent size in sheet x 10)]. These curves are presented in Fig. 4. The curves would suggest that in this case the abietic acid tends to accelerate aging to a somewhat greater degree than does the G gum rosin. It is possible, however, that the operations involved in purifying the abietic acid rendered it more susceptible to attack by external influences than the untreated rosin. Chintshin (*5*) has suggested that physico-chemical changes may exert great effects upon the stability or reactivity of rosin.

TABLE VIII.—SLOPES OF AGING CURVES FOR HANDSHEETS SIZED WITH PURE ABIETIC ACID WHEN OVEN AGED AT 110 DEG. C.

| Abietic Acid Added per cent | Added Abietic Acid in Sheet per cent | Slope of Aging Curve (Hrs. $^{-1/2}$) |
|---|---|---|
| 0 | 0.00 | 0.0044 |
| 1 | 0.40 | 0.0054 |
| 2 | 0.83 | 0.0082 |
| 3 | 1.25 | 0.0086 |

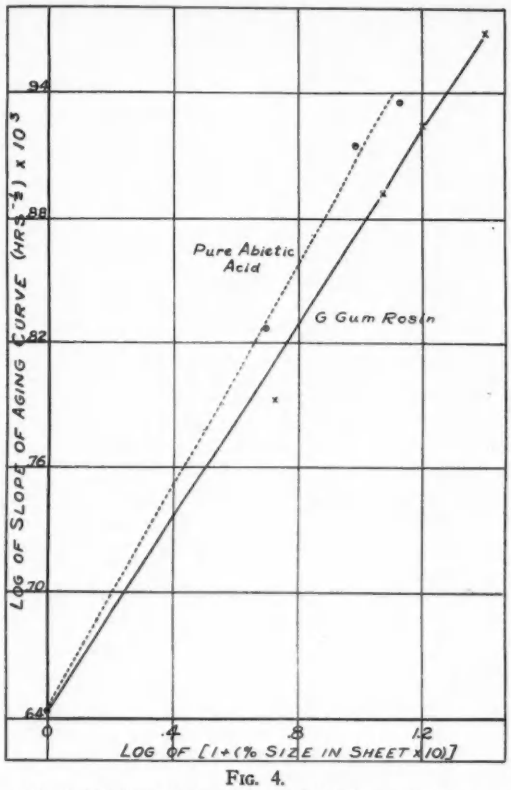


FIG. 4.
**Logarithmic Relation between Slope of Aging Curve and Amount of Size in Sheet.**

B. STUDY OF DISCOLORATION OF UNSIZED HANDSHEETS

Although the rosin sizing process is responsible to a large degree for the discoloration of papers, it is, nevertheless, true that unsized paper discolors also but at a slower rate. The discoloration of unsized paper is undoubtedly due in great measure to the effects of aging upon such of its constitutents as lignin, resins, degraded celluloses, and the like. Since in ordinary bleached sulphite pulp, the contents of lignin and of natural resins may be in the vicinity of 0.5 per cent, their discoloring influences during the aging of the pulp might conceivably be small. On the other hand, however, it is possible that relatively large amounts of degraded celluloses, often called bleach residues, have been formed during the bleaching process. It is necessary, therefore, to determine which of these constituents of the sheet is most largely involved in the discoloration mechanism.

*Influence of Increasing Amounts of Bleach*

Samples of a commercial unbleached sulphite pulp were bleached according to the Institute Standard Method 409 for bleach requirement of pulp, using 3, 6, 9, 12, and 15 per cent of bleaching powder based on the weight of the oven dry pulp. The bleached pulps were thoroughly washed with distilled water, after which handsheets were prepared in accordance with the TAPPI Standard Method T 205 M. The sheets were oven aged at 100 deg. C., the temperature employed for the aging tests in this section. The data are given in Table IX. Although the numerical values of the slopes of the curves differ scarcely at all, the data do show that the $K/S$ number is reduced by bleaching. Assuming that $K/S$ is proportional to the quantity of substances which cause yellowing, it is possible that their formation is roughly independent of bleaching.

*Influence of Natural Resin*

A quantity of bleached sulphite prepared from the commercial unbleached pulp serving as the base stock was extracted with neutral alcohol in a Soxhlet extractor for ten hours. The extracted pulp was washed well with distilled water, and handsheets were made for the aging test. Results are given in Table X. Curves from the data are not smoothly linear and diverge but slightly. Slope values calculated from the best straight lines representing the

TABLE IX.—INFLUENCE OF DEGREE OF BLEACHING UPON RATE OF DISCOLORATION OF HANDSHEETS OVEN AGED AT 100 DEG. C.

$T$ = Hours Aged.

| Bleaching Powder, per cent | | 3 | | 6 | | 9 | | 12 | | 15 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lignin, per cent ..... | | 0.84 | | 0.15 | | 0.10 | | 0.09 | | 0.10 | |
| $T$ | $\sqrt{T}$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ |
| 0 | 0.00 | 59.0 | 0.1425 | 72.3 | 0.0531 | 78.3 | 0.0301 | 81.7 | 0.0205 | 84.9 | 0.0134 |
| 1 | 1.00 | 57.7 | 0.1551 | 70.0 | 0.0643 | 75.4 | 0.0401 | 78.7 | 0.0288 | 80.7 | 0.0231 |
| 2 | 1.41 | 57.5 | 0.1576 | 69.4 | 0.0675 | 74.5 | 0.0436 | 77.8 | 0.0320 | 79.8 | 0.0256 |
| 4 | 2.00 | 57.2 | 0.1601 | 68.5 | 0.0724 | 73.1 | 0.0495 | 76.1 | 0.0379 | 78.7 | 0.0288 |
| 8 | 2.83 | 56.7 | 0.1653 | 67.3 | 0.0793 | 71.5 | 0.0568 | 74.3 | 0.0449 | 77.6 | 0.0323 |
| 12 | 3.46 | 56.4 | 0.1685 | 66.5 | 0.0844 | 70.8 | 0.0602 | 73.0 | 0.0499 | 76.2 | 0.0372 |

data are 0.0026 for the unextracted pulp and 0.0018 for the extracted. In this range of low slope values such a difference may not be unduly emphasized, but certainly the aging behaviors of the pulps are not the same.

TABLE X.—INFLUENCE OF ALCOHOL-EXTRACTABLE RESIN UPON RATE OF DISCOLORATION OF HANDSHEETS OVEN AGED AT 100 DEG. C.

$T$ = Hours Aged.

| Natural Resin in Sheet, % | | Unextracted Pulp 0.57 | | Alcohol-Extracted Pulp 0.21 | |
|---|---|---|---|---|---|
| $T$ | $\sqrt{T}$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ |
| 0 | 0.00 | 81.1 | 0.0220 | 81.4 | 0.0213 |
| 1 | 1.00 | 79.6 | 0.0261 | 80.4 | 0.0239 |
| 2 | 1.41 | 79.1 | 0.0276 | 80.0 | 0.0250 |
| 4 | 2.00 | 78.5 | 0.0294 | 79.7 | 0.0259 |
| 8 | 2.83 | 78.0 | 0.0310 | 79.3 | 0.0270 |
| 16 | 4.00 | 77.6 | 0.0323 | 78.8 | 0.0285 |
| 24 | 4.90 | 76.6 | 0.0357 | 78.0 | 0.0310 |

*Influence of Bleach Residues*

A quantity of the unbleached sulphite was bleached under carefully controlled conditions, and was washed with cold water until free from chlorides. The removal of bleach residues from the bleached pulp was accomplished by treatment with an 8 per cent solution of sodium hydroxide, using a ratio of chemical to pulp of four to one. The mixture was maintained at 10 deg. C. for an hour, after which the gelatinous mass was transferred to a filter cloth on a Büchner funnel. After being washed with distilled water, followed by 10 per cent acetic acid solution, the pulp cake was defibered in distilled water by means of an agitator to insure complete removal of the acid. After final washing with large volumes of distilled water, the pulp was made into handsheets for testing. The effect of the purification treatment is reflected in the values of the following chemical constants:

| | Bleached Sulphite | Purified Bleached Sulphite |
|---|---|---|
| Alpha Cellulose (per cent) | 80.8 | 95.7 |
| Copper Number | 3.16 | 1.05 |

Aging data are listed in Table XI.

TABLE XI.—INFLUENCE OF BLEACH RESIDUES UPON RATE OF DISCOLORATION OF HANDSHEETS OVEN AGED AT 100 DEG. C.

$T$ = Hours Aged.

| | | Bleached Sulphite | | Purified Bleached Sulphite | |
|---|---|---|---|---|---|
| $T$ | $\sqrt{T}$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ |
| 0 | 0.00 | 81.3 | 0.0215 | 83.2 | 0.0170 |
| 1 | 1.00 | 78.8 | 0.0285 | 82.7 | 0.0181 |
| 2 | 1.41 | 78.3 | 0.0301 | 82.5 | 0.0186 |
| 4 | 2.00 | 77.2 | 0.0337 | 82.2 | 0.0193 |
| 8 | 2.83 | 76.5 | 0.0361 | 81.6 | 0.0208 |
| 12 | 3.46 | 75.3 | 0.0405 | 81.2 | 0.0218 |
| 24 | 4.90 | 73.4 | 0.0482 | 79.9 | 0.0253 |
| 36 | 6.00 | 71.8 | 0.0554 | ... | ... |
| 48 | 6.93 | ... | ... | 79.1 | 0.0276 |
| 60 | 7.75 | 69.7 | 0.0659 | ... | ... |
| 72 | 8.49 | 68.7 | 0.0713 | 78.8 | 0.0285 |

The slope values for the aging curves are 0.0058 for the bleached sulphite and 0.0014 for the purified bleached sulphite. These tests, which were extended through an abnormal time of aging, demonstrate clearly the extent to which bleach residues hasten the discoloration of paper upon aging. These degraded celluloses are present to a considerable degree in the unpurified pulp as shown by the low alpha cellulose content. Characterized by strong reducing capacity, it is indicated that these substances possess a reactivity greater than that of the more resistant cellulose, and that they manifest their susceptibility to certain influences, in this instance heat, by darkening readily. The purified pulp must be acted upon by heat for relatively long periods before exhibiting significant discoloration.

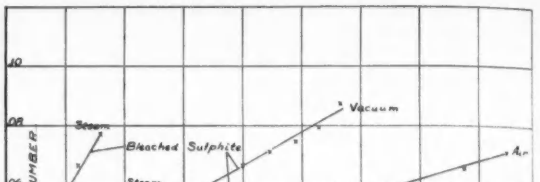


FIG. 5.
Discoloration Curves for Aging of Pulp Sheets under Various Conditions at 100 deg. C.

*Influence of Relative Humidity on Aging in Steam*

Samples of the bleached and of the purified bleached sulphite pulps were suspended in a wide mouth bottle in the aging oven, and steam was passed through the bottle during the aging interval. The aging proceeded so rapidly under these conditions that only a short time was required to obtain a set of data. The results are given in Table XII and are discussed together with similar data for aging in a vacuum.

TABLE XII.—VARIATION IN KUBELKA AND MUNK NUMBER FOR HANDSHEETS AGED IN STEAM AT 100 DEG. C.

$T$ = Hours Aged.

| | | Bleached Sulphite | | Purified Bleached Sulphite | |
|---|---|---|---|---|---|
| $T$ | $\sqrt{T}$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ |
| 0.0 | 0.00 | 79.8 | 0.0256 | 82.5 | 0.0186 |
| 0.5 | 0.71 | 73.3 | 0.0486 | ... | ... |
| 1.0 | 1.00 | 71.0 | 0.0592 | 75.4 | 0.0401 |
| 1.5 | 1.22 | 69.5 | 0.0669 | ... | ... |
| 2.0 | 1.41 | ... | ... | 73.0 | 0.0499 |
| 2.5 | 1.58 | 67.7 | 0.0771 | ... | ... |
| 4.0 | 2.00 | ... | ... | 71.5 | 0.0568 |

*Influence of Relative Humidity on Aging in a Vacuum*

Test sheets of the pulps used in the above experiment were suspended in a wide mouth bottle fitted with a rubber stopper carrying a thermometer and a connection to a Cenco Hyvac oil pump capable of reducing the pressure within the bottle to less than $10^{-3}$mm. The system was exhausted for ninety minutes before the sample bottle was transferred to the steam bath, and the evacuation of the system was continued throughout the aging interval. Aging data are presented in Table XIII.

TABLE XIII—VARIATION IN KUBELKA AND MUNK NUMBER FOR HANDSHEETS AGED IN VACUUM AT 100 DEG. C.

$T$ = Hours Aged.

| | | Bleached Sulphite | | Purified Bleached Sulphite | |
|---|---|---|---|---|---|
| $T$ | $\sqrt{T}$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ |
| 0 | 0.00 | 80.8 | 0.0228 | 83.3 | 0.0167 |
| 1 | 1.00 | 77.0 | 0.0344 | 81.8 | 0.0202 |
| 2 | 1.41 | 75.8 | 0.0386 | 81.2 | 0.0218 |
| 4 | 2.00 | 74.6 | 0.0432 | 80.3 | 0.0242 |
| 8 | 2.83 | 74.0 | 0.0457 | 79.8 | 0.0256 |
| 12 | 3.46 | 71.0 | 0.0592 | 79.7 | 0.0259 |
| 16 | 4.00 | 69.5 | 0.0669 | ... | ... |
| 20 | 4.47 | 68.7 | 0.0713 | 78.2 | 0.0304 |
| 24 | 4.90 | 68.1 | 0.0747 | ... | ... |
| 28 | 5.29 | 67.3 | 0.0793 | ... | ... |
| 32 | 5.66 | 66.0 | 0.0876 | 77.6 | 0.0323 |

The aging curves for the bleached sulphite and the purified bleached sulphite pulps in air, in steam, and in a vacuum are given in Fig. 5. The slopes of these curves are:

| | In Air | In Steam | In Vacuum |
|---|---|---|---|
| Bleached Sulphite | 0.0058 | 0.0328 | 0.0107 |
| Purified Bleached Sulphite | 0.0014 | 0.0195 | 0.0027 |

The enormous acceleration in rate of discoloration for aging in steam must be ascribed to the combined agencies of heat and moisture. Since the degraded celluloses exert a strong tendency to discolor the sheet, the increased rate of discoloration in steam must be due to some form of hydrolytic attack upon these reactive substances.

From the results obtained by aging in steam and by ordinary oven aging, one might assume that in a vacuum the discoloration rate would be reduced to a minimum. However, discoloration proceeds approximately twice as fast in a vacuum as it does in the air. Since, under the conditions of vacuum employed, the concentration of moisture and atmospheric gases in the aging vessel is very materially reduced, little, if any, aging influence would ordinarily be expected from these agents. It might be suggested that, under the combined conditions of elevated temperature and greatly reduced pressure, structural variations might arise in the fiber to be reflected in the more rapid discoloration obtained in vacuum aging.

*Aging at Various Relative Humidities*

The measurement of discoloration rates at different relative humidities was accomplished by means of the following air-humidifying equipment. A humidity train, consisting of four sixteen-ounce bottles filled to three quarters capacity with freshly boiled distilled water and connected in series as gas scrubbers, was completely immersed in a wax bath. The inlet tube of the train was connected with a source of compressed air through a gas scrubber and a stopcock. The bath was fitted with an insulating cover of heavy sponge rubber. Holes were made in the cover to accommodate the inlet and outlet tubes of the train, the bath thermometer, the shaft of the bath agitator, and the thermometer in the final bottle of the humidifying train. The outlet tube, which carried the humidified air, was wound with thin copper flashing, and was heated throughout its length by means of wing-topped burners to prevent condensation of moisture. This tube communicated directly with the bottle containing the paper samples to be aged. The sample bottle also carried a thermometer and an air outlet tube, and for the aging test was heated in a steam bath.

The paraffin bath temperature, controllable to 0.5 deg. C., made it possible to regulate the system within 0.3 deg. C. After maintaining the saturated air at the desired temperature for a time sufficient to insure equilibrium, the outlet tube of the humidity train was connected with the air inlet of the sample bottle in the steam bath. The relative humidity of the air within the sample bottle was calculated from the value of the vapor pressure of the saturated air at known temperature and its value at the temperature within the sample bottle in the steam bath. Control of the relative humidity was possible to within two per cent.

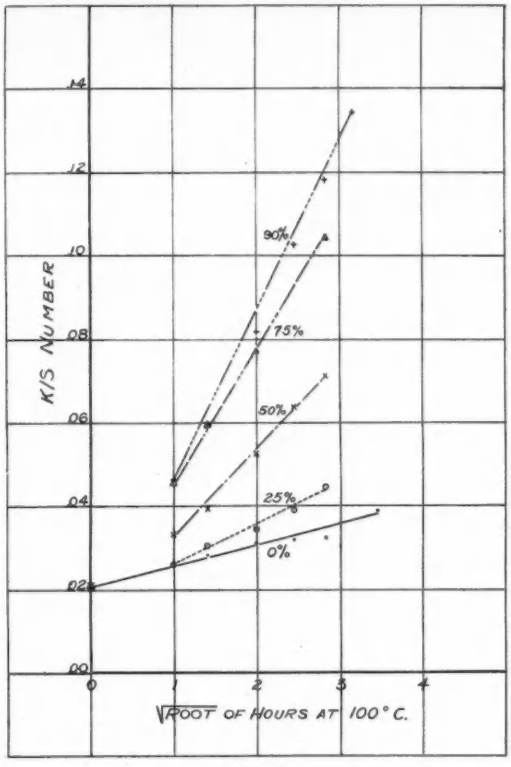


FIG. 6.
**Kubelka and Munk Number *K/S* for Bleached Sulphite Handsheets Against √Root Time of Aging at 100 deg. C. at Various Relative Humidities.**

Sheets of bleached sulphite pulp were aged at relative humidities of 0, 25, 50, 75, and 90 per cent. In this instance the zero relative humidity data must not be associated with data for aging in a vacuum. The experimental results in Table XIV show that at the higher relative humidities the rate of discoloration is greatly accelerated, to such an extent, in fact, that the plots of the original Kubelka and Munk numbers do not fall in line with plots for higher humidities in Fig. 6. The slope values for the curves are listed in Table XV. The type of curve indicates that at this temperature the rate of discoloration is proportional to the concentration of moisture in the aging atmosphere.

TABLE XV.—SLOPES OF AGING CURVES FOR BLEACHED SULPHITE HANDSHEETS AT VARIOUS HUMIDITIES AT 100 DEG. C.

| Relative Humidity, % | Slope of Aging Curve (Hrs. $^{-1/2}$) |
|---|---|
| 0 | 0.0048 |
| 25 | 0.0085 |
| 50 | 0.0215 |
| 75 | 0.0319 |
| 90 | 0.0401 |

Additional sheets of the same pulp were aged

TABLE XIV.—INFLUENCE OF RELATIVE HUMIDITY UPON KUBELKA AND MUNK NUMBER FOR BLEACHED SULPHITE HANDSHEETS WHEN AGED AT DIFFERENT HUMIDITIES AT 100 DEG. C.

$T$ = Hours Aged.

| Relative Humidity, % | | 0 | | 25 | | 50 | | 75 | | 90 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | $\sqrt{T}$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ | $R_\infty$ | $K/S$ |
| 0 | 0.00 | 81.6 | 0.0207 | 81.9 | 0.0200 | 81.7 | 0.0205 | 81.6 | 0.0207 | 81.4 | 0.0213 |
| 1 | 1.00 | 79.5 | 0.0264 | 79.6 | 0.0261 | 77.3 | 0.0333 | 74.0 | 0.0457 | 73.9 | 0.0461 |
| 2 | 1.41 | 78.9 | 0.0282 | 78.2 | 0.0304 | 75.6 | 0.0394 | 71.0 | 0.0592 | 71.0 | 0.0592 |
| 4 | 2.00 | 77.9 | 0.0313 | 77.0 | 0.0344 | 72.4 | 0.0526 | 67.7 | 0.0771 | 66.9 | 0.0819 |
| 6 | 2.45 | 77.7 | 0.0320 | 75.7 | 0.0390 | 70.1 | 0.0638 | ... | ... | 63.8 | 0.1027 |
| 8 | 2.83 | 77.5 | 0.0327 | 74.3 | 0.0444 | 68.7 | 0.0713 | 63.6 | 0.1042 | 61.8 | 0.1181 |
| 10 | 3.16 | ... | ... | ... | ... | ... | ... | ... | ... | 60.1 | 0.1342 |
| 12 | 3.46 | 75.7 | 0.0390 | ... | ... | ... | ... | ... | ... | ... | ... |

TABLE XVI—VARIATION IN KUBELKA AND MUNK NUMBER AND COPPER NUMBER OF BLEACHED SULPHITE HAND-SHEETS AGED AT DIFFERENT RELATIVE HUMIDITIES AT 100 DEG. C.

$T$ = Hours Aged.

| Relative Humidity, % | | 0 | | | 50 | | | 90 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | $\sqrt{t}$ | $R_\infty$ | $K/S$ | Cu No. | $R_\infty$ | $K/S$ | Cu No. | $R_\infty$ | $K/S$ | Cu No. |
| 0 | 0.00 | 80.6 | 0.0233 | 2.93 | 80.1 | 0.0247 | 2.93 | 80.1 | 0.0247 | 2.93 |
| 2 | 1.41 | 79.0 | 0.0279 | 2.98 | 73.7 | 0.0469 | 2.98 | 67.0 | 0.0813 | 3.34 |
| 4 | 2.00 | 78.0 | 0.0310 | 2.98 | 70.8 | 0.0602 | 2.99 | 65.7 | 0.0895 | 3.50 |
| 8 | 2.83 | 76.9 | 0.0347 | 3.06 | 66.4 | 0.0850 | 3.16 | 59.6 | 0.1369 | 3.63 |

under similar conditions at relative humidities of 0, 50, and 90 per cent, and the copper number and reflectivity were determined for the aged samples. The results are presented in Table XVI. It is strongly indicated that the presence of excessive moisture at elevated temperatures promotes a hydrolytic attack upon the fiber, which is evidenced by an increase in copper number and a rapid discoloration of the sheet. Although the experimental conditions were severe, the trend of the results is quite likely reproduced on a diminished scale under the normal circumstances attending paper usage.

### Summary

Among the causes of paper discoloration, rosin size appears to be a very notable example. It was found experimentally that, when a commercial sulphite pulp was made into handsheets containing approximately 0.9 per cent of a common grade rosin, the reflectivity, or brightness, of the pulp had fallen quite generally from 80 to 75. When oven aged for increasing intervals at 110 deg. C., both unsized and sized sheets suffered loss in reflectivity by almost equal decrements, so that after 48 hours of aging the respective reflectivities were 70 and 65. To represent satisfactorily such data in graphical form it was found advisable to express reflectivity as the Kubelka and Munk number, $K/S$. A straight line was then obtained from these data by application of the empirical relation $(K/S) = (K/S)_0 + c\sqrt{t}$, where $t$ is the time of aging in hours and $c$ is a constant. The slope of this line, known as the aging curve, when expressed in the above terms was used as a numerical index of the rate of discoloration upon aging.

Applying this principle to the case of the example given above, the sized sheets were found to discolor half again as rapidly as the unsized sheets. When a series of sheets containing increasing amounts of rosin was aged the log-log relation of the aging rates and the rosin contents proved to be a straight line.

Samples of a commercial sulphite pulp were bleached to various degrees of whiteness. The discoloration rates for sheets from this series of bleaches appear to be roughly independent of the degree of bleaching. Removal of a portion of the natural resin from a sulphite pulp by alcohol extraction tends to lower the discoloration rate. Purification of a sulphite pulp by removing the bleach residues with caustic soda results in a significant decrease in the rate of discoloration. A pulp purified in this way was found to discolor only 25 per cent as fast as the original pulp. At 25 per cent relative humidity and above, the rate of discoloration upon aging increases linearly with the relative humidity of the aging atmosphere at 100 deg. C. The more rapid aging rates at the higher relative humidities are accompanied by an increase in the copper number.

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## Springhill Producing Pulp

Announcement is being made by Gottesman & Co., Inc., 22 East 40th street, New York, N. Y., sole selling agents for bleached and unbleached kraft pulps made by the Southern Kraft Corporation mills of the International Paper Company, that the new Springhill, La. mill is in production and the bleached kraft made there is now available for sale.

The most modern equipment for the production of bleached kraft has been installed and samples of the product are ready for distribution. This new and ever more popular grade of pulp should meet with favorable reception and adds another to the long list of pulps offered to the paper trade by Gottesman & Co., Inc., whose connection with the paper and pulp industry extends back to 1886.

The Southern Kraft Corporation are also producing unbleached kraft for sale and the kraft pulp output of their Georgetown, S. C. mill was first offered about one year ago.

## S.A.P.I. Trade Customs

The Trade Customs Committee of the Salesmen's Association of the Paper Industry and members of the Western division have been active during the past month on the question of divisional trade customs. A plan to publish a consolidated book of divisional trade customs for the use of mill salesmen and paper merchants is being considered. With the visit of president Jack Burruss in New York last week, activity has shifted to the eastern division of the Association. President Barruss explained the plan in detail and obtained suggestions for going ahead with the program.

# Imports of Paper and Paper Stock

## Giving Manifests of New York, Boston, Philadelphia and Other Ports, of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

### NEW YORK IMPORTS

WEEK ENDING AUGUST 20, 1938

SUMMARY

Cigarette paper.....742
Wall paper.....6 rolls, 29 cs.
Paperhangings.....5 bls.
Newsprint.....133 bls. 6,621 rolls
Printing paper.....73 cs.
Wrapping paper.....26 bls., 2,515 rolls
Filter paper.....64 pkgs., 12 cs.
Drawing paper.....1 cs.
Bristol boards.....1 cs.
Surface baryta coated paper.....73 cs.
Surface coated paper.....100 cs.
Transparent paper.....4 cs.
Transfer paper.....16 cs.
Decalcomania paper.....21 cs.
Colored paper.....11 cs.
Tissue paper.....8 bbls., 35 cs.
Writing paper.....1 cs.
Stencil paper.....1 cs.
Miscellaneous paper.....59 bls., 42 cs.

#### CIGARETTE PAPER

Champagne Paper Corp., *Normandie,* Havre, 393 cs.
De Mauduit Paper Corp., *Normandie,* Havre, 2 cs.
Braunstein Freres, Inc. *Normandie,* Havre, 33 cs.
De Mauduit Paper Corp., *Washington,* Havre, 193 cs.
R. J. Reynolds Tobacco Co., *Washington,* Havre, 121 cs.

#### WALL PAPER

Titan Shipping Co., *Oslofjord,* Hagastrom, 7 cs.
J. E. Bernard Co., *Pr. Roosevelt,* Havre, 6 rolls.
W. J. Jones, *Georgic,* London, 2 cs.
W. J. Jones, *Aquitania,* Southampton, 5 cs.
——, *Washington,* Havre, 15 cs.

#### PAPER HANGINGS

W. H. S. Lloyd & Co., *American Merchant,* London, 5 bls.

#### NEWSPRINT

N. Y. Evening Journal, *Markland,* Liverpool, N. S., 600 rolls.
N. Y. Tribune, Inc., *Markland,* Liverpool, N. S., 1,603 rolls.
World Telegram, *Markland,* Liverpool, N. S., 561 rolls.
Brooklyn Daily Eagle, *Markland,* Liverpool, N. S., 403 rolls.
Herald Statesman, *Markland,* Liverpool, N. S., 28 rolls.
Gilman Paper Co., *Markland,* Liverpool, N. S., 503 rolls.
——, *Oslofjord,* Oslo, 75 rolls.
N. Y. Evening Journal, *Pr. Roosevelt,* Hamburg, 257 rolls.
Jay Madden Corp., *Pr. Roosevelt,* Hamburg, 282 rolls.
Perkins Goodwin & Co., *Pr. Roosevelt,* Hamburg, 105 rolls.
H. G. Graig Co., Inc., *Donpaco,* Donnacona, 415 rolls.
H. G. Craig Co., Inc., *Newscarrier,* Donnacona, 265 rolls.
——, *Columbus,* Bremen, 133 bls.
Jay Madden Corp., *Columbia,* Bremen, 443 rolls.
Jay Madden Corp., *Scanyork,* Kotka, 181 rolls.
Jay Madden Corp., *Washington,* Hamburg, 281 rolls.
N. Y. Evening Journal, *Washington,* Hamburg, 257 rolls.
Perkins Goodwin & Co., *New York,* Hamburg, 61 rolls.
International Paper Co., *G.T.D.,* Gatineau, 301 rolls.

#### PRINTING PAPER

Dingelstedt & Co., *Columbus,* Bremen, 19 cs.
L. A. Consmiller, *Columbus,* Bremen, 51 cs.
R. J. Saunders, *Washington,* Southampton, 3 cs.

#### WRAPPING PAPER

Gilson Bros., Inc., *Pr. Roosevelt,* Hamburg, 963 rolls.
Salwen Paper Co., *Pr. Rooscevelt,* Hamburg, 71 rolls.
Gilson Bros., Inc., *Tunaholm,* Gothenburg, 81 rolls.
Gilson Bros., Inc., *Washington,* Bjorneborg, Finland, 308 rolls.
L. Glickman & Co., *Washington,* Bjorneborg, Finland, 1,092 rolls, 26 bls.

#### FILTER PAPER

H. Reeve Angel & Co., Inc., *Georgic,* London, 11 cs.
H. Reeve Angel & Co., Inc., *Asquitania,* Southampton, 64 pkgs.
Eastman Kodak Co., *American Merchant,* London, 1 cs.

#### DRAWING PAPER

H. S. Dorf & Co., *Washington,* Hamburg, 1 cs.

#### BRISTOL BOARDS

Devoe & Raynolds Co., *American Merchant,* London, 1 cs.

#### SURFACE BARYTA COATED PAPER

L. A. Consmiller, *Columbus,* Bremen, 46 cs.
——, *Pennland,* Antwerp, 27 cs.

#### SURFACE COATED PAPER

Gevaert Co., of America, *Pennland,* Antwerp, 100 cs.

#### TRANSPARENT PAPER

Phoenix Shipping Co., *New York,* Hamburg, 4 cs.

#### TRANSFER PAPER

Fuchs & Lang Manfg. Co., *New York,* Hamburg, 16 cs.

#### DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Scythia,* Liverpool, 21 cs.

#### COLORED PAPER

J. W. Hampton, Jr., & Co., *Black Eagle,* Antwerp, 3 cs.
Hensel Bruckman & Lorbacher, *New York,* Hamburg, 8 cs.

#### TISSUE PAPER

W. J. Brynes, *Pr. Roosevelt,* Southampton, 1 cs.
F. C. Strype, *American Shipper,* Liverpool, 1 cs.
Jay Madden Corp., *Scanyork,* Helsingfors, 8 bbls., 1 cs.
Van Oppen & Co., *Excambion,* Genoa, 32 cs.

#### WRITING PAPER

R. H. Macy & Co., *Pr. Roosevelt,* Havre, 1 cs.

#### STENCIL PAPER

American Express Co., *Black Eagle,* Antwerp, 1 cs.

#### MISCELLANEOUS PAPER

Titan Shipping Co., *American Merchant,* London, 1 cs.
A. Giese & Son, *Normandie,* Havre, 1 cs., 58 bls.
Globe Shipping Co., *Normandie,* Havre, 7 cs.
Standard Products Corp., *Normandie,* Havre, 5 cs.
The Morilla Co., *Normandie,* Havre, 6 cs.
Remington Rand, Inc., *Tokai Maru,* Kobe, 20 cs.
Jay Madden Corp., *Scanyork,* Helsingfors, 1 ble.
Chase National Bank, *New York,* Hamburg, 2 cs.

#### RAGS, BAGGINGS, ETC.

Manufacturers Trust Co., *Scythia,* Liverpool, 33 bls. rags, 3 bls. thread waste.
Chase National Bank, *Maria,* Algiers, 150 bls. rags.
F. Stern, *Black Eagle,* Rotterdam, 83 bls. bagging.
Darmstadt Scott & Courtney, *Black Eagle,* Rotterdam, 34 bls. bagging scrap.
E. J. Keller Co., Inc., *American Shipper,* ——, 76 bls. paper stock.
——, *American Shipper,* Manchester, 136 bls. paper stock.
M. Lobsitz, *American Shipper,* Manchester, 8 bls. rags, 6 bls. thread waste.
Darmstadt Scott & Courtney, *Scanyork,* Copenhagen, 76 bls. bagging scrap.
Guaranty Trust Co., *Scanyork,* Copenhagen, 8 bls. scrap cloth.

Banco Coml Italiane Trust Co., *Nicolai Ejov,* Leningrad, 797 bls. rags & waste.
———, *Nicolai Ejov,* Leningrad, 140 bls. rags, 309 bls. linen cuttings, 21 bls. flax waste.
Chase National Bank, *Nicolai Ejov,* Leningrad, 763 bls. linen rags, 124 bls. linen cuttings, 98 bls. rags, 152 bls. cotton cuttings.
Chase National Bank, *Washington,* Hamburg, 91 bls. bagging.
Darmstadt Scott & Courtney, *Rotterdam,* Rotterdam, 78 bls. bagging.
———, *Excambion,* Alexandria, 87 bls. bagging.
Hughes Fawcett, Inc., *New York,* Hamburg, 13 bls. flax-waste.

GLUE STOCK, ETC.

Banco Coml Italiane Trust Co., *Maria,* Trieste, 141 bdls. glue stock.
Darmstadt Scott & Courtney, *Maria,* Trieste, 19 bdls. glue stock.
J J. Murphy & Co., *American Shipper,* Liverpool, 534 bags hide cuttings.

OLD ROPE

Banco Coml Italiane Trust Co., *Transylvania,* Glasgow, 91 coils.
Banco Coml Italiane Trust Co., *Pennland,* Antwerp, 62 coils.
Banco Coml Italiane Trust Co., *Scanyork,* Copenhagen, 136 coils.
W. Steck & Co., Inc., *Rotterdam,* Rotterdam, 60 coils.
W. Steck & Co., Inc., *Excambion,* Marseilles, 39 coils.
E. J. Keller Co., Inc., *Anna Maersk,* ———, 100 bls.

WOOD PULP

Atterbury Bros., Inc., *Oslofjord,* Oslo, 450 bls. sulphite.
Chase National Bank, *Oslofjord,* Oslo, 300 bls. sulphite.
Brown Bros., Harriman & Co., *Maria,* Trieste, 780 bls. sulphite.
Pulp Sales Corp., *Mormacsun,* Kemi, 2,680 bls. sulphite, 447 tons.
Pagel Horton & Co., Inc., *Mormacsun,* Stockholm, 300 bls. Chemical pulp, 50 tons.
Pulp Sales Corp., *Scanyork,* Wiborg, 1,600 bls. sulphite, 320 tons, 381 bls. sulphate, 76 tons, 985 bls. mechanically ground pulp, 195 tons.
D. M. Hicks, Inc., *Tunaholm,* Gothenburg, 450 bls. sulphite.
———, *New York,* Hamburg, 392 bls. wood pulp, 53 tons.
———, *New York,* Hamburg, 280 bls. sulphite, 50 tons.
Bank of N. Y. Trust Co., *New York,* Hamburg, 400 bls. woodpulp, 80 tons.

WOOD PULP BOARDS, ETC.

Jay Madden Corp., *Scanyork,* Wiborg, 229 bls., 32 tons.
Jay Madden Corp., *Scanyork,* Kotka, 242 rolls, 77 bls., 68 tons.
W. Bersch, *New York,* Hamburg, 300 bls., 30 tons.
———, *New York,* Hamburg, 10 rolls.
———, *New York,* Hamburg, 100 bls. (sheets).

## PORTLAND IMPORTS

WEEK ENDING AUGUST 20, 1938

Pulp Sales Corp., *Mormacsun,* Kemi, 7,514 bls. sulphate. 1,254 tons.
Pulp Sales Corp., *Mormacsun,* Varjakka, 2,425 bls. sulphate, 485 tons, 500 bls. sulphate knotter pulp, 100 tons.
Parsons & Whittemore, Inc., *Konigsberg,* ———, 329 bls. wood pulp.

## BOSTON IMPORTS

WEEK ENDING AUGUST 20, 1938

———, *Maria,* Trieste, 731 bls. wood pulp.
Pulp Sales Corp., *Mormacsun,* Kemi, 170 bls. sulphite, 28 tons, 165 bls. sulphite knotter pulp, 28 tons, 1800 bls. sulphate, 300 tons.
Pulp Sales Corp., *Mormacsun,* Varjakka, 148 bls. sulphite, 25 tons, 1,910 bls. sulphate, 382 tons, 250 bls. sulphate knotter pulp, 50 tons.
Lagerloef Trading Co., *Mormacsun,* Helsingfors, 285 bls. mechanically ground pulp, 57 tons.
Pulp Sales Corp., *Mormacsun,* Helsingfors, 353 bls. sulphite, 65 tons.
M. Sone, *Mormacsun,* Stockholm, 750 bls. sulphite, 127 tons.
Perkins Goodwin & Co., *Mormacsun,* Stockholm, 300 bls. sulphite, 50 tons.
The Borregaard Co., Inc., *Tunaholm,* Gothenburg, 750 bls. dry chemical pulp.
Perkins Goodwin & Co., *Tunaholm,* Gothenburg, 1,189 bls. sulphate.
———, *Tunaholm,* Gothenburg, 254 bls. sulphate.
Gottesman & Co., Inc., *Tunaholm,* Gothenburg, 600 bls. wood pulp.
Boston Paper Board Co., *Tunaholm,* Gothenburg, 62 rolls newsprint.
———, *Tunaholm,* Gothenburg, 283 bdls. wall board
Pagel Horton & Co., Inc., *Kelkheim,* Sweden, 2,330 bls. wood pulp.
Parsons & Whittemore, Inc., *Carolina Thorden,* ———, 2,250 bls. wood pulp.
Price & Pierce, Ltd., *Kelkheim,* ———, 1740 bls. unbleached sulphate, 4,350 bls. unbleached sulphite.
Gottesman & Co., Inc., *Kelkheim,* Sweden, 710 bls. unbleached sulphite, 500 bls. bleached sulphite.

## NEW LONDON IMPORTS

WEEK ENDING AUGUST 20, 1938

Chase National Bank, *Maria,* Trieste, 3,533 bls. wood pulp.

## PHILADELPHIA IMPORTS

WEEK ENDING AUGUST 20, 1938

Moore & Munfer, *Belnor,* Fowey, 585 tons china clay.
Paper Makers Importing Co., *Belnor,* Fowey, 1,292 tons china clay.
J. W. Higman Co., *Belnor,* Fowey, 582 tons china clay.
Brown Bros, Harriman & Co., *Maria,* Trieste, 1,050 bls. sulphite.
Neidich Process Co., *Scanyork,* Helsingfors, 15 bbls. tissue paper.
Pulp Sales Corp., *Scanyork,* Wiborg, 3,556 bls. sulphite, 652 tons.
Pulp Sales Corp., *Scanyork,* Kotka, 260 bls. mechanically ground pulp, 52 tons.
J. W. Hampton, Jr., Co., *Scanyork,* Kotka, 301 rolls newsprint.
The Public Ledger, Inc., *Scanyork,* Kotka, 356 rolls newsprint.
Parsons & Whittemore, Inc., *Wonja,* ———, 2,625 bls. wood pulp.

## BALTIMORE IMPORTS

WEEK ENDING AUGUST 20, 1938

Washington Post, *Markland,* Liverpool, N. S., 925 rolls newsprint.
Chase National Bank, *Maria,* Trieste, 10,104 bls. wood pulp.
American Express Co., *Black Eagle,* Antwerp, 3 cs. stencil paper.
Perkins Goodwin & Co., *Tunaholm,* Gothenburg, 168 bls. sulphate.
Arkell & Smith, *Tunaholm,* Gothenburg, 161 rolls kraft paper.
Congoleum Nairn Co., *Excambion,* Marseilles, 137 bls. rags.
Parsons & Whittemore, Inc., *Caroline Thorden,* ———, 3,000 bls. wood pulp.

## NORFOLK IMPORTS

WEEK ENDING AUGUST 20, 1938

American Express Co., *Black Eagle,* Antwerp, 12 cs. wrapping paper.

## CHARLESTON IMPORTS

WEEK ENDING AUGUST 20, 1938

Chase National Bank, *Kimikawa Maru,* Kobe, 600 bls. bagging.
E. J. Keller Co., Inc., *Tulsa,* ———, 107 bls. bagging.
E. J. Keller Co., Inc., *Sundance,* ———, 80 bls. bagging.

## MONTREAL IMPORTS

WEEK ENDING AUGUST 20, 1938

Gottesman & Co., Inc., *Idefjord,* Sweden, 8,735 bls. unbleached sulphite.

## Magnus Cement Cleaner

A new folder just issued by the Magnus Chemical Company, 13 South avenue, Garwood, N. J., describes the merits of the Magnus Cement Cleaner for removing dirt, grease and oil from garage and machine shop floors and other cement surfaces. The company offers to send a keg or a barrel on thirty days trial.

## New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, August 24, 1938.

The slight improvement in the demand for many grades of paper and board is reported as continuing during the current week. Although the index of general business activity shows only a small gain over the preceding week, and the average production ratio of a large group of important mills shows little change, the uptrend in both production and distribution is indicated as definitely upward. The price situation, while not satisfactory in some grades of paper, is also improved and much less price cutting under representative quoted market prices is currently reported. In general, the opinion expressed by mill representatives, jobbers and wholesalers, indicates an improved market situation which augurs better business in the future. Prices are more firm than for some months.

The demand for newsprint continues to show improvement which, while slight, is expected in the trade to result in a more substantial uptrend in demand next month.

The demand for some grades of book papers is reported improved for the week. Sales of several grades of sulphite papers are reported as better for the current week than for the preceding week, though most distributors report sales volume for the current month is below that of July, but higher than in June.

The tissue paper market reports conditions as improved. Mills continue to operate at a high rate of capacity and the practice of giving price concessions is decreasing.

Activity in writing papers is reported as less than in July but the trend in demand is held to be upward and considerable improvement is looked for next month.

The distribution of kraft papers continues at a relatively high level and is quite well balanced with production, which continues at a high level, despite the slight decline in production reported for the current week.

In box board, substantial improvement is reported this week. Prices which have been somewhat soft for some weeks are now quite firm under an improved demand and the outlook for this division of the paper industry is better than it has been for many months. In general, all prices hold firm and no change from prevailing representative quoted market prices have been reported for the current week.

### Mechanical Pulp

Business in mechanical pulp continues light. Some slight improvement is reported in some quarters of the trade but the prevailing opinion reflects little change in demand. The minimum quotations on No. 1 imported moist mechanical pulp is $25 per ton and $26 per ton for dry pulp, on dock, Atlantic ports.

### Chemical Pulp

The trend in demand for chemical pulp is reported as downward and the amount of business is characterized as light. In some quarters of the trade reports on current conditions indicate that imports are accumulating on the docks. Supply at the mills is quite generally conceded to be large. Little change is expected during the remainder of this month. Prices for the higher grades of pulp continue relatively firm since the recent reduction in the price of bleached sulphite to $50 per ton. The only important reduction since that time is in bleached soda pulp which is currently quoted at $51 per ton, delivered.

### Old Rope and Bagging

Demand for old rope continues to be reported as light. Prices are fairly firm and no changes are reported for this week. The demand for old bagging is light. Prices are unchanged.

### Rags

The demand for new and old domestic rags is light. During the current month a large dealer reports an increase in export orders for paper making rags, while the domestic market has remained dull. The foreign rag market continues inactive at nominal prices.

### Waste Paper

No noteworthy change in demand or prices is reported in waste paper for this week. Prices on all grades are quite firm, with a slightly firmer tone on some grades of old kraft.

### Twine

Demand for hard and soft fiber twines continues light. Prices continue quite firm and are unchanged from prevailing quotations. Somewhat more optimism is reflected in the trade and expectations are for an improvement in the near future.

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## Delthirna Sizing System

A new catalogue just issued by the American Delthirna Corporation, 250 Park avenue, New York, describes the merits of the company's cold, continuous method of making rosin size in a single operation. The process consists in passing a cold solution of caustic soda, of about ½ of 1 per cent concentration, over coarsely broken rosin at a rate of flow that results in a uniform saturated solution of rosin. It is claimed that either gum or wood rosin can be used and that neither a chemist nor a skilled laborer is required to operate the simple Delthirna system, which is stated to be based on sound chemical and physical principles and its practical value proved in more than two hundred paper mills.

# Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, August 24, 1938.

BLANC FIXE—The prices of blanc fixe continue firm and conform to prevailing quotations. The pulp is quoted at from $42.50 to $45 per ton, in bulk; the powder is offered at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Quotations on bleaching powder continue firm and unchanged at prevailing market prices. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The demand for casein is reported as quite active for the week. Prices are firm. Domestic ground casein is currently quoted at from 9½ to 10 cents per pound; domestic finely ground at from 10 to 10½ cents per pound. All quotations in bags, car lot quantities.

CAUSTIC SODA—Quotations on caustic soda are firm and conform to prevailing quotations. Solid caustic soda is quoted at from $2.10 to $2.30 per 100 pounds; flake and ground at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—The prices of china clay continue firm and are unchanged at prevailing market quotations. Imported clay is quoted at from $14.50 to $25 per ton, ship side. Domestic filler clay is quoted at from $6.50 to $12 per ton; coating clay at from $11 to $22 per ton, at mines.

CHLORINE—Quotations on chlorine continue firm and unchanged at prevailing market prices. Chlorine is quoted at $2.15 per 100 pounds, in single, unit tank cars, f.o.b., works.

ROSIN—The demand for rosin is reported good. Prices are unchanged from the preceding week. "G" gum rosin is quoted at $4.55; "FF" wood rosin at $4.55 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent gum size is quoted at $2.62 per 100 pounds, f.o.b., shipping point.

SALT CAKE—The demand for salt cake is reported as moderate. Prices continue firm and range at from $12 to $13.50 per ton; chrome salt cake at from $11 to $12 per ton, f.o.b., shipping point. Imported salt cake is quoted at from $14.50 to $15 per ton, Gulf or Atlantic Seaboard, on dock.

SODA ASH—Quotations on soda ash are firm and conform to prevailing prices. Quotations on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—The demand for corn starch is reported as moderate. Globe pearl is quoted at $2.45 per 100 pounds, in bags, and at $2.70 in barrels. Special paper starch is quoted at $2.55 per 100 pounds, in bags, and at $2.80 in barrels. All prices in car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina continue firm and conform to prevailing market prices. The commercial grades are quoted at $1.15 per 100 pounds; iron free at $1.30 per 100 pounds, in barrels, car lot quantities.

SULPHUR—Quotations on sulphur are firm and continue unchanged at prevailing market prices. Annual contracts are quoted at $18 per long ton, f.o.b., cars at mines. Spot and nearby car lots are offered at $21 per ton.

TALC—Prices on talc continue firm and conform to prevailing market quotations. Domestic talc is quoted at from $15 to $18 per ton, Eastern mines. Imported talc is quoted at from $25 to $40 per ton, on dock.

# Market Quotations

## Paper

**(Delivered New York)**

| | | | |
|---|---|---|---|
| **News, per ton—** | | | |
| Roll, contract | $50.00 | @ | — |
| Sheets | 58.00 | @ | — |
| **Kraft—per cwt.—Delivered Zone A** | | | |
| No. 1 Northern | $5.25 | @ | — |
| Superstandard | 4.12½ | @ | 5.00 |
| Northern Standard Wrapping | 4.50 | @ | — |
| Standard Wrapping | 4.00 | @ | — |
| **Tissues—Per Ream—Carlots** | | | |
| White No. 1 | .92½ | @ | — |
| White No. 1 M. G. | .90 | @ | — |
| White No. 1½ | .67½ | @ | — |
| White No. 2 | .60 | @ | — |
| Anti-Tarnish M. G. | .75 | @ | — |
| Colored | .87½ | @ | — |
| Kraft | .75 | @ | — |
| Manila | .60 | @ | — |
| Unbl. Toilet, 1 M. | 3.20 | @ | — |
| Bleached Toilet | 5.26 | @ | — |
| **Paper Towels—** | | | |
| Unbleached | 1.80 | @ | — |
| Bleached | 2.10 | @ | — |
| **Manila—per cwt.—C. l. f. a.** | | | |
| No. 1 Jute | $8.25 | @ | $9.75 |
| No. 2 Jute | 7.50 | @ | 9.00 |
| No. 1 Manila Wrapping, 35 lb. | 5.00 | @ | — |
| No. 2 Manila Wrapping, 35 lb. | 4.75 | @ | — |
| **Boards, per ton—** | | | |
| News | $27.50 | @ | $30.00 |
| Chip | 27.50 | @ | 30.00 |
| Sgl. Mla. Ll. Chip. | 42.50 | @ | — |
| Jute Lined Chip | 42.50 | @ | 45.00 |
| White Pat. Coated. | 55.00 | @ | 57.50 |
| Kraft Liners | 42.50 | @ | 50.00 |
| Binders Boards | 71.00 | @ | 77.00 |

The following are representative of distributors' resale prices:—

**Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:**

| | Bonds | Ledgers |
|---|---|---|
| 100% Rag Ext. No. 1. | $39.10@$46.00 | $40.25@$47.25 |
| 100% Rag | 31.05@ 36.50 | 32.20@ 37.75 |
| 85% Rag | ..... | 29.90@ 35.00 |
| 75% Rag | 23.60@ 27.75 | 24.75@ 29.00 |
| 65% Rag | ..... | 21.65@ 26.25 |
| 50% Rag | 17.55@ 21.50 | 18.70@ 22.75 |
| 25% Rag | 14.65@ 17.75 | 15.80@ 19.25 |

Colors at $1.00 cwt. extra

**Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:**

| | Bonds | Ledgers |
|---|---|---|
| No. 1 | $8.80@$10.75 | $9.95@$12.00 |
| No. 2 | 7.90@ 9.50 | 9.05@ 11.00 |
| No. 4 | 7.00@ 8.50 | 8.20@ 10.00 |

Colors $1.00 cwt. extra.

**Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:**

| | | |
|---|---|---|
| No. 1 Glossy Coated | $10.80 | @$12.25 |
| No. 2 Glossy Coated | 9.25 | @ 10.50 |
| No. 3 Glossy Coated | 8.15 | @ 9.25 |
| No. 4 Glossy Coated | 7.65 | @ 8.75 |
| No. 1 Antique (watermarked) | 7.65 | @ 8.75 |
| No. 2 Offset | 7.00 | @ 8.00 |
| A Grade E. F. | 6.80 | @ 7.75 |
| A Grade S. & S. C. | 7.05 | @ 8.00 |
| B Grade E. F. | 6.25 | @ 7.25 |
| B Grade S. & S. C. | 6.50 | @ 7.50 |
| C Grade E. F. | 6.00 | @ 7.00 |
| C Grade S. & S. C. | 6.25 | @ 7.25 |
| D Grade E. F. | 5.70 | @ 6.75 |
| D Grade S. & S. C. | 5.95 | @ 7.00 |

Ivory & India at $.50 cwt. extra.

## Mechanical Pulp

**(On Dock, Atlantic Ports)**

| | | |
|---|---|---|
| No. 1 Imported— | | |
| Moist | 25.00 | @ 30.00 |
| Dry | 26.00 | @ 30.00 |
| **(Delivered)** | | |
| No. 1 Domestic and Canadian | 29.00 | @ 33.00 |

## Chemical Pulp

**(On Dock, Atlantic, Gulf and West Coast Ports)**

| | | |
|---|---|---|
| **Bleached Sulphite (Domestic and Foreign)—** | | |
| Prime Bleached Sulphite | 2.50 | @ 3.00 |
| **Prime Qualities—** | | |
| Easy-Bleaching Sulphite | 2.15 | @ 2.25 |
| Strong Unbleached Sulphite | 1.85 | @ 2.15 |
| **(On Dock, Atlantic Ports)** | | |
| Kraft Bleached | 2.75 | @ 3.00 |
| Kraft Light & Strong | 2.00 | @ 2.15 |
| Kraft No. 1 | 1.85 | @ 2.00 |
| Kraft No. 2 | 1.65 | @ 1.80 |
| **(F.o.b. Pulp Mill)** | | |
| Kraft Domestic | 1.75 | @ 2.25 |
| **(Delivered)** | | |
| Soda Bleached | 2.55 | @ — |

**Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.**

## Domestic Rags

**New Rags**

**(Prices to Mill f. o. b. N. Y.)**

| | | |
|---|---|---|
| Shirt Cuttings— | | |
| New White, No. 1. | 6.75 | @ 7.00 |
| Silesias No. 1 | 4.00 | @ 4.25 |
| New Unbleached | 6.75 | @ 7.00 |
| Blue Overall | 5.50 | @ 5.75 |
| Fancy | 2.10 | @ 2.25 |
| Washables | 1.60 | @ 1.70 |
| Mixed Khaki Cuttings | 3.25 | @ 3.75 |
| O. D. Khaki Cuttings | 4.00 | @ 4.25 |

**Old Rags**

| | | |
|---|---|---|
| White, No. 1— | | |
| Repacked | 3.15 | @ 3.40 |
| Miscellaneous | 2.60 | @ 2.75 |
| White, No. 2— | | |
| Repacked | 2.10 | @ 2.35 |
| Miscellaneous | 1.70 | @ 1.80 |
| Thirds and Blues— | | |
| Repacked | 1.40 | @ 1.50 |
| Miscellaneous | 1.25 | @ 1.30 |
| **Roofing Rags—** | | |
| No. 1 | 1.00 | @ 1.10 |
| No. 2 | .85 | @ .90 |
| No. 3 (bagging) | .65 | @ .70 |
| No. 4 | .65 | @ .70 |
| No. 5A | .65 | @ .70 |

## Foreign Rags

**New Rags**

| | | |
|---|---|---|
| New Dark Cuttings | 2.25 | @ 2.40 |
| New Mixed Cuttings | 2.00 | @ 2.20 |
| New Light Silesias | 5.50 | @ 5.75 |
| Light Flannelettes | 5.50 | @ 5.75 |
| New White Cuttings | 7.00 | @ 7.50 |
| New Light Oxford | 4.00 | @ 4.50 |
| New Light Prints | 3.00 | @ 3.25 |

**Old Rags**

| | | |
|---|---|---|
| No. 1 White Linens | 7.50 | @ 8.50 |
| No. 2 White Linens | 6.50 | @ 7.50 |
| No. 3 White Linens | 4.50 | @ — |

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for PAPER
and PULP
MILLS

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AGENTS

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CAledonia 5-5260 to 69

| | | | |
|---|---|---|---|
| No. 4 White Linens. | 2.25 | @ | 3.25 |
| No. 1 White Cotton. | 4.25 | @ | 4.75 |
| No. 2 White Cotton. | 3.25 | @ | 3.75 |
| No. 3 White Cotton. | 2.50 | @ | 3.00 |
| No. 4 White Cotton. | 1.90 | @ | 2.20 |
| Extra Light Prints.. | 2.00 | @ | 2.40 |
| Ord. Light Prints... | 1.75 | @ | 2.15 |
| Med. Light Prints... | 1.55 | @ | 1.95 |
| Dutch Blue Cottons.. | 2.25 | @ | 2.50 |
| French Blue Linens.. | 3.00 | @ | — |
| Checks and Blues... | 2.00 | @ | — |
| Linsey Garments.... | 1.90 | @ | 2.00 |
| Dark Cottons..... | 1.50 | @ | 1.60 |
| Old Shopperies..... | 1.30 | @ | 1.45 |
| New Shopperies..... | 1.45 | @ | 1.50 |
| French Blues..... | 2.25 | @ | 2.50 |

### Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

| | | | |
|---|---|---|---|
| Gunny No. 1— | | | |
| Foreign ..... | 2.40 | @ | 2.50 |
| Domestic ..... | 2.25 | @ | 2.35 |
| Wool Tares, light... | 1.80 | @ | 1.90 |
| Wool Tares, heavy... | 1.90 | @ | 2.00 |
| Bright Bagging..... | 1.70 | @ | 1.80 |
| Manila Rope— | | | |
| Foreign ..... | 2.50 | @ | 2.75 |
| Domestic ..... | 2.50 | @ | 2.75 |
| Jute Threads..... | 2.75 | @ | 3.00 |
| Sisal Strings..... | 1.50 | @ | 1.60 |
| Mixed Strings..... | .60 | @ | .70 |

### Old Waste Papers

(F. o. b. New York)

| | | | |
|---|---|---|---|
| Shavings— | | | |
| White Envelope Cuttings ..... | 2.65 | @ | 2.70 |
| Ordinary Hard White No. 1.... | 1.90 | @ | 2.00 |
| Soft White No. 1.. | 1.75 | @ | 1.80 |
| Soft White Extra.. | 2.25 | @ | 2.40 |
| Flat Stock— | | | |
| Stitchless ..... | .80 | @ | .85 |
| Overissue Mag..... | .70 | @ | .75 |
| Solid Flat Book... | .60 | @ | .65 |
| Crumbled No. 1... | .40 | @ | .45 |
| Ledger Stock White. | 1.35 | @ | 1.40 |
| Ledger Stock Colored | .80 | @ | .90 |
| New B. B. Chips.... | .15 | @ | .20 |
| Manila— | | | |
| New Env. Cut..... | 1.40 | @ | 1.50 |
| New Cuttings..... | 1.25 | @ | 1.35 |
| Old Kraft Machine— | | | |
| Compressed bales.. | .85 | @ | .90 |
| News— | | | |
| No. 1 White News | 1.35 | @ | 1.40 |
| Strictly Overissue.. | .50 | @ | .55 |
| Strictly Folded.... | .35 | @ | .40 |
| No. 1 Mixed Paper.. | .15 | & | .20 |

### Twines

(F. o. b. Mill)
(Soft Fiber)

| | | | |
|---|---|---|---|
| Coarse Polished— | | | |
| India ..... | .11 | @ | .13 |
| White Hemp..... | .12 | @ | .14 |
| Fine Polished— | | | |
| Fine India..... | .15 | @ | .17 |
| Unpolished— | | | |
| Box ..... | .08½ | @ | — |
| Paper Makers..... | .07½ | @ | .08½ |
| Tube Rope..... | .09 | @ | .10 |
| Wall Paper..... | .10 | @ | .11 |
| Wrapping ..... | .11 | @ | .13 |
| Soft Fiber Rope... | .09½ | @ | .11½ |
| Cotton ..... | .15 | @ | .20 |
| (Hard Fiber) | | | |
| Medium Java..... | .09 | @ | .10 |
| Mex. Sisal..... | .08½ | @ | .09½ |
| Manila ..... | .18 | @ | .25 |

| | | | |
|---|---|---|---|
| Domestic ..... | 2.25 | @ | 2.50 |
| Sisal Rope..... | 1.65 | @ | 1.85 |
| Mixed Rope..... | .50 | @ | .75 |
| Transmission Rope... | 1.60 | @ | 1.85 |
| Soft Jute Ropes..... | 1.85 | @ | 2.00 |
| Jute Carpet Threads.. | .75 | @ | .90 |
| Gunny Bagging— | | | |
| Foreign ..... | 2.37½ | @ | 2.40 |
| Domestic ..... | 2.00 | @ | — |
| Bleachery Burlap.... | 3.25 | @ | 3.62½ |
| Scrap Burlap— | | | |
| Foreign ..... | 1.50 | @ | 1.60 |
| Domestic ..... | 1.35 | @ | 1.40 |
| Scrap Sisal ..... | 1.25 | @ | 1.50 |
| Scrap Sisal for Shredding ..... | 1.75 | @ | 1.90 |
| Wool Tares, Heavy.. | 1.50 | @ | 1.60 |
| New Burlap Cuttings | 1.75 | @ | 2.00 |
| Aust. Wool Pouches. | 2.75 | @ | 3.10 |
| Heavy baling bagging | 2.00 | @ | — |
| Paper Mill Bagging.. | 1.00 | @ | 1.15 |
| No. 2 Bagging..... | .60 | @ | .70 |

### Domestic Rags (New)

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Shirt Cuttings— | | | |
| New Light Prints. | .03 | @ | .03¼ |
| New White No. 1... | .06½ | @ | .06¾ |
| New White No. 2. | .05 | @ | .05½ |
| New Light Flannelettes ..... | .04¾ | @ | .04¾ |
| Silesias No. 1..... | .04¼ | @ | .04¾ |
| New Black Silesias.. | .03¾ | @ | .04 |
| Silesias No. 1 | | | |
| Soft Unbleached..... | .06 | @ | .06½ |
| Blue Cheviots..... | .05 | @ | .05¼ |
| Fancy ..... | .03 | @ | .03¼ |
| Washable ..... | .02¾ | @ | .03 |

| | | | |
|---|---|---|---|
| Cottons—According to grades— | | | |
| Blue Overalls..... | .04¼ | @ | .04 |
| New Black, soft... | .03¾ | @ | .04 |
| Khaki Cuttings.... | .03¼ | @ | .03¾ |
| O. D. Khaki..... | .04 | @ | .04½ |
| Corduroy ..... | .02¾ | @ | .03 |
| New Canvas..... | .06¾ | @ | .07¼ |
| B.V.D. Cuttings..... | — | @ | .06½ |

### Domestic Rags (Old)

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Canvas ..... | .04½ | @ | — |
| White No. 1— | | | |
| Repacked ..... | — | @ | 2.75 |
| Miscellaneous ..... | 2.50 | @ | 2.75 |
| White No. 2— | | | |
| Repacked ..... | 1.90 | @ | 2.00 |
| Miscellaneous ..... | 2.00 | @ | 2.25 |
| Twos and Blues..... | 1.75 | @ | 2.00 |
| Old Blue Overalls... | 1.50 | @ | — |
| Third and Blues— | | | |
| Repacked ..... | 1.37½ | @ | 1.75 |
| Miscellaneous ..... | 1.25 | @ | 1.40 |
| Black Stockings..... | 3.90 | @ | 4.00 |
| Roofing Stock— | | | |
| No. 1..... | 1.00 | @ | 1.10 |
| No. 2..... | .75 | @ | .80 |
| No. 3..... | .65 | @ | .70 |

### Foreign Rags

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Dark Cottons..... | 1.00 | @ | 1.05 |
| Dutch Blues..... | 2.65 | @ | 2.75 |
| New Checks and Blues | 2.85 | @ | 3.00 |
| Old Fustians..... | 2.25 | @ | 2.50 |
| Old Linsey Garments | 2.20 | @ | 2.25 |
| New Silesias..... | 6.00 | @ | 6.50 |

## PHILADELPHIA

### Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

| | | | |
|---|---|---|---|
| Shirt Cuttings— | | | |
| New White, No. 1. | .06 | @ | .06¼ |
| New White, No. 2. | .03½ | @ | .04 |
| Light Silesias..... | .04 | @ | .04½ |
| Silesias, No. 1.... | — | @ | .04½ |
| Black Silesias, soft. | — | @ | .03 |
| New Unbleached.. | .05½ | @ | .06 |
| Washable, No. 1.. | .01¼ | @ | .01½ |
| Blue Overall..... | .04 | @ | .04½ |
| Cottons—According to grades— | | | |
| Washable No. 2... | .01 | @ | .01¼ |
| New Blue..... | .01 | @ | .01¼ |
| Fancy Percales.... | — | @ | .02½ |
| New Black Soft... | .03 | @ | .03½ |
| New Light Seconds | — | @ | .04½ |
| New Dark Seconds | .50 | @ | .75 |
| Khaki Cuttings— | | | |
| No. 1 O. D..... | .03 | @ | .03½ |
| No. 2 Mixed..... | .02 | @ | .02½ |
| Corduroy ..... | — | @ | .02 |
| New Canvas..... | .05 | @ | .05½ |
| New Black Mixed. | .02½ | @ | .02¾ |

### Domestic Rags (Old)

| | | | |
|---|---|---|---|
| White No. 1— | | | |
| Repacked ..... | 3.00 | @ | 3.25 |
| Miscellaneous .... | 2.50 | @ | 2.75 |
| Thirds and Blues— | | | |
| Miscellaneous ..... | 1.00 | @ | 1.25 |
| Repacked ..... | 1.50 | @ | 1.75 |
| Black Stockings (Export) ..... | 3.00 | @ | 3.50 |
| Roofing Stock— | | | |
| Foreign No. 1.... | — | @ | .75 |
| Domestic No. 1... | — | @ | 1.00 |
| Domestic No. 2... | — | @ | .85 |
| Roofing Bagging.. | — | @ | .70 |

### Bagging

(F. o. b. Phila.)

| | | | |
|---|---|---|---|
| Gunny, No. 1— | | | |
| Foreign ..... | 1.50 | @ | 1.75 |
| Domestic ..... | 1.50 | @ | 1.75 |
| Manila Rope..... | 3.00 | @ | 3.25 |
| Sisal Rope..... | — | @ | 1.50 |
| Mixed Rope..... | .75 | @ | 1.00 |
| Scrap— | | | |
| No. 1..... | — | @ | 1.50 |
| No. 2..... | 1.00 | @ | 1.25 |
| Wool Tares, heavy.. | 3.25 | @ | 3.50 |
| Mixed Strings..... | 1.00 | @ | 1.10 |
| No 1 New Light Burlap ..... | 2.50 | @ | 3.00 |
| New Burlap Cuttings | 1.75 | @ | 2.00 |

### Old Papers

(F. o. b. Phila.)

| | | | |
|---|---|---|---|
| Shavings— | | | |
| No. 1 Hard White. | 2.25 | @ | 2.30 |
| No. 2 Hard White. | 2.00 | @ | 2.10 |
| No. 1 Soft White.. | 1.80 | @ | 1.90 |
| No. 2 Soft White.. | 1.30 | @ | 1.40 |
| No. 1 Mixed..... | .70 | @ | .75 |
| Solid Ledger Stock.. | 1.50 | @ | 1.60 |
| Ledger Stock, white. | 1.20 | @ | 1.25 |
| Ledger Stock, colored | .75 | @ | .80 |
| No. 1 Books, heavy.. | .65 | @ | .70 |
| Manila Cuttings..... | 1.50 | @ | 1.75 |
| Print Manila..... | .40 | @ | .45 |
| Container Manila.... | — | @ | .40 |
| Kraft Paper..... | .85 | @ | .90 |
| No. 1 Mixed Paper.. | .20 | @ | .25 |
| Straw Board Chip... | .25 | @ | .30 |
| Binders Board Chip. | .25 | @ | .30 |
| Corrugated Board... | .50 | @ | .55 |
| Overissue News..... | .50 | @ | .55 |
| Old Newspapers..... | .35 | @ | .40 |

## BOSTON

### Old Papers

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Shavings— | | | |
| No. 1 Hard White | 2.25 | @ | 2.50 |
| No. 1 Soft White.. | 1.85 | @ | 2.15 |
| No. 2 Mixed..... | .75 | @ | .80 |
| Solid Ledger Books.. | 1.50 | @ | 1.75 |
| Overissue Ledger Stock ..... | 1.30 | @ | 1.50 |
| Mixed Ledgers..... | .85 | @ | .90 |
| No. 1 Books, heavy.. | .65 | @ | .75 |
| No. 1 Books, light... | .65 | @ | .75 |
| Crumpled Stitchless Book Stock..... | .55 | @ | .65 |
| Manila Env Cuttings | 1.60 | @ | 1.70 |
| Manila Envelope Cuttings, extra quality. | 2.00 | @ | 2.10 |
| No. 1 Old Manila... | .95 | @ | 1.00 |
| White Blank News.. | 1.30 | @ | 1.40 |
| No. 1 Kraft..... | .90 | @ | 1.00 |
| Mixed Papers..... | .15 | @ | — |
| Print Manila..... | .45 | @ | .55 |
| Container Manilas... | .27½ | @ | — |
| Old Newspapers..... | .25 | @ | .32½ |
| Paper Wool Strings.. | .80 | @ | — |
| Overissue News..... | .45 | @ | .50 |
| Box Board Chips.... | .20 | @ | .25 |
| Corrugated Boxes... | .30 | @ | .32½ |
| Kraft corrugated boxes | .65 | @ | .70 |
| Screening Wrappers.. | .40 | @ | .45 |

### Bagging

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Manila Rope— | | | |
| Foreign ..... | 2.40 | @ | 2.50 |

## CHICAGO

### Old Papers

(F. o. b. Chicago)

| | | | |
|---|---|---|---|
| Shavings— | | | |
| No. 1 White Envelope Cuttings.... | 1.80 | @ | 1.90 |
| No. 1 Hard White. | 1.70 | @ | 1.80 |
| No. 1 Soft White.. | 1.50 | @ | — |
| Ledger & Writings.. | .75 | @ | .80 |
| Solid Books..... | .55 | @ | — |
| Blanks ..... | .90 | @ | — |
| Krafts ..... | .60 | @ | — |
| New Kraft Cuts..... | 1.10 | @ | — |
| Manila Env. Cuts... | Nominal | | |
| Ex. No. 1 Manila... | Nominal | | |
| Print Manila..... | Nominal | | |
| Overissue News..... | .35 | @ | — |
| Old Newspapers— | | | |
| No. 1 Folded News | .30 | @ | — |
| No. 1 Mixed Paper | .20 | @ | — |
| Roofing Stocks— | | | |
| No. 1..... | 2.00 | @ | 2.10 |
| No. 2..... | 1.85 | @ | 1.90 |

## TORONTO

### Paper

### Bonds and Ledgers

Delivered

| | | | |
|---|---|---|---|
| No. 1 White ..... | .36½ | @ | — |
| No. 1 Tints ..... | .37½ | @ | — |
| No. 2 White ..... | .26½ | @ | — |
| No. 2 Tints ..... | .27½ | @ | — |
| No. 4 White ..... | — | @ | .1550 |
| No. 4 Tints .....16.50 | | @ | — |
| No. 5 Bond—White 11.85 | | @ | — |
| No. 5 Bond—Tints .12.85 | | @ | — |
| No. 5 Bond—Golden Rod .....13.35 | | @ | — |
| No. 5 Ledger—White .1185 | | @ | — |
| No. 5 Ledger—Tints. .1285 | | @ | — |
| No. 6 Bond—White .10.75 | | @ | — |
| No. 6 Bond—Tints .11.25 | | @ | — |
| No. 6 Bond—Golden Rod .....12.75 | | @ | — |
| No. 7 Bond—White . 9.10 | | @ | — |
| No. 7 Bond—Tints . 9.60 | | @ | — |
| No. 7 Bond—Golden Rod .....11.10 | | @ | — |
| Book— | | | |
| No. 1 M. F. ..... 7.35 | | @ | — |
| No. 2 M. F. ..... 6.85 | | @ | — |
| No. 3 M. F. ..... 5.60 | | @ | — |
| No. 1 S. C. ..... 7.60 | | @ | — |
| No. 2 S. C. ..... 7.10 | | @ | — |
| No. 3 S. C. ..... 6.10 | | @ | 6.35 |
| No. 1 Coated Book and Litho .....12.50 | | @ | — |
| No. 2 Coated Book and Litho .....11.00 | | @ | — |
| No. 3 Coated Book and Litho .....10.00 | | @ | — |
| Coated tinted.....13.50 | | @ | — |
| Wrapping—delivered— | | | |
| Rag Brown..... | 4.85 | @ | 5.50 |
| White Wrap..... | 4.00 | @ | — |
| "B" Manila..... | 4.90 | @ | 6.25 |
| No. 1 Manila..... | 5.50 | @ | 7.00 |
| Fiber ..... | 5.50 | @ | — |
| Kraft No. 2..... | 5.50 | @ | — |

(F. o. b. Cars, Toronto)

| | | | |
|---|---|---|---|
| News per ton— | | | |
| Rolls (contract)..$50.00 | | @ | — |
| Sheets .....69.50 | | @ | — |

### Pulp

| | | | |
|---|---|---|---|
| Ground wood.....29.00 | | @ | — |
| Unbleached Sulphite..49.00 | | @ | — |
| Book (Class 1).....59.00 | | @ | — |
| Writing (Class 2)...57.00 | | @ | — |
| Select (Class 3).....58.00 | | @ | — |
| Kraft .....50.00 | | @ | — |
| Soda .....54.00 | | @ | 56.00 |

### Old Waste Paper

(In carload lots, f. o. b. Toronto)

| | | | |
|---|---|---|---|
| Shavings— | | | |
| White Env. Cut... | 2.25 | @ | — |
| Soft White..... | 2.15 | @ | — |
| White Blk. News.. | 1.25 | @ | — |
| Book and Ledger— | | | |
| Flat Magazine and Book Stock (old) | .80 | @ | — |
| Light and Crumpled Book Stock. | .70 | @ | — |
| Ledgers and Writings ..... | 1.10 | @ | — |
| Manilas— | | | |
| New Manila Cut... | 1.35 | @ | — |
| Printed Manilas... | .45 | @ | — |
| Kraft ..... | .95 | @ | — |
| News and Scrap— | | | |
| Strictly Overissue. | .50 | @ | — |
| Strictly Folded.... | .45 | @ | — |
| No. 1 Mixed Paper.. | .30 | @ | — |

### Domestic Rags

(Price to mills, f. o. b. Toronto)

| | | | |
|---|---|---|---|
| No. 1 White Shirt Cuttings ..... | .06½ | @ | .06¾ |
| Fancy Shirt Cuttings | .02¼ | @ | .02½ |